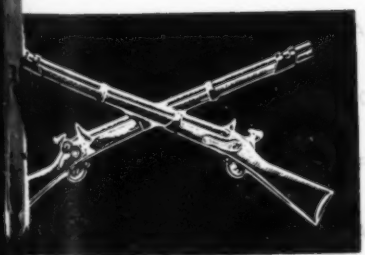
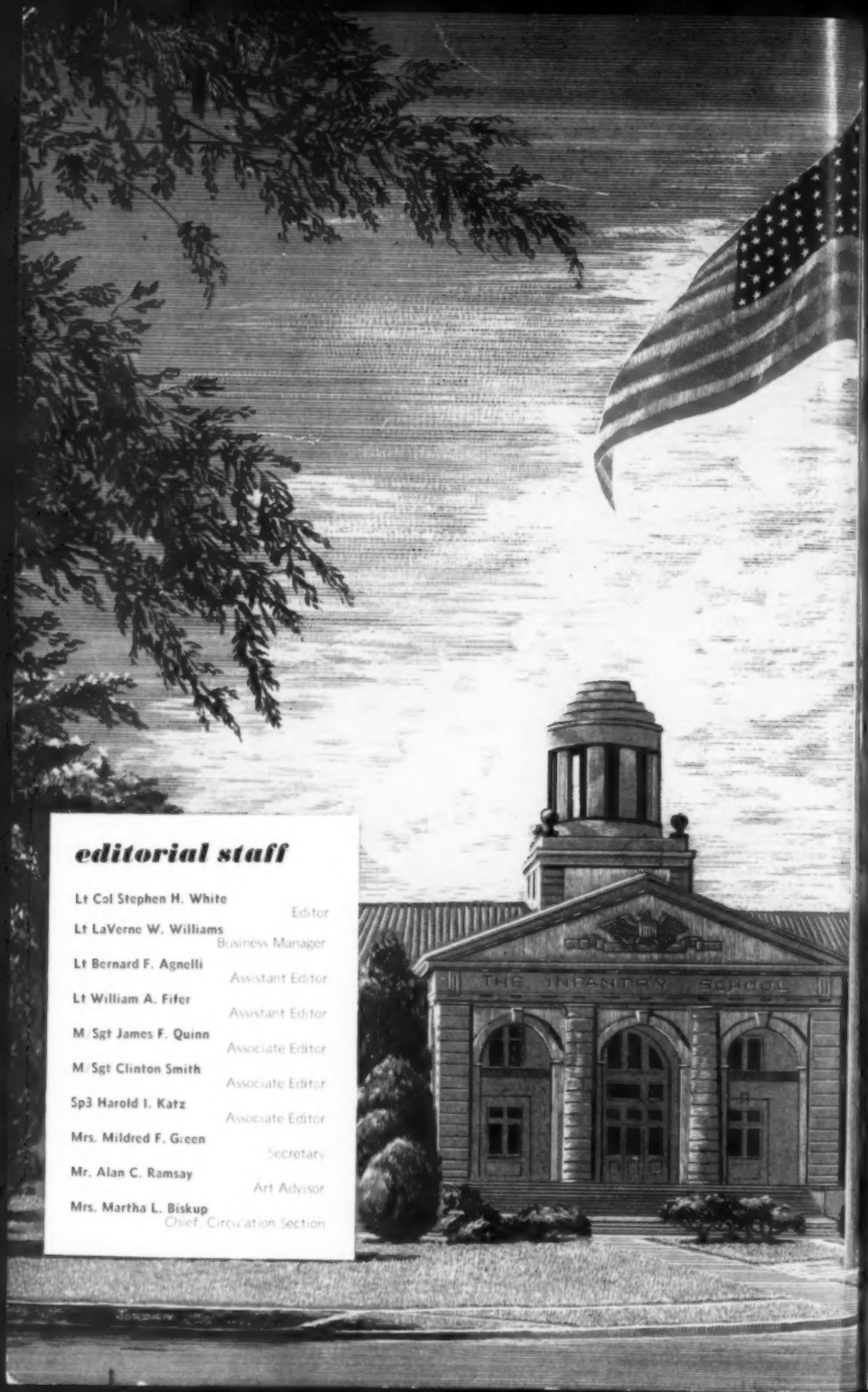
Infantry

the magazine for infantrymen

july 1957





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Infantry

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U. S. ARMY INFANTRY SCHOOL

volume 47 number 3 — july 1957

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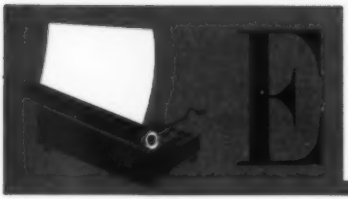


EDITOR'S PAGE

Dear Reader:

The Army, particularly the Infantry, is undergoing sweeping changes that will give us units and capabilities with little resemblance to those we knew in World War II and Korea. These changes range from "bare knees" to atomic artillery; from the new green uniform to the pentomic structures of our reorganized Infantry and Airborne divisions. They include new weapons and new tactics and provide for progressive integration of additional developments that can be expected during the next few years.

Infantrymen, and those who work with Infantry, must keep abreast of these accelerated changes. We must understand how specific changes fit into our requirements and plans for combat on the atomic battlefield. *Infantry* magazine will do everything possible to provide needed information. It will publish contemplated and approved developments that affect the Infantry and will attempt to relate each specific item to overall plans.

Past issues of *Infantry* have carried information on a number of items while they were still in the developmental stage. Battle Drill, Trainfire I, the 11 man rifle squad and many of the weapons and tactics discussed in *Infantry* have recently been adopted. With the publishing of the ROCID organization in the April issue, the reason for many of these developments became clear. Others will become more understandable as additional material is published on this organization.

In this issue we have an important "package" of related articles on pentomic Infantry division organization, tactics, firepower and mobility. In the next issue, and in issues for some time to come, other aspects of the new Infantry division; its weapons, its tactics and techniques for its employment will be discussed.

THE EDITOR

The Redstone missile, currently the Army's largest, takes its place along with other missiles and new weapons in support of ground troops on the atomic battlefield. The Redstone is controlled at Army or higher level.

U S A R M Y

LETTERS TO THE EDITOR

Airmen Read *Infantry*

Sir:

. . . I would like to take this opportunity to make a few comments about your very wonderful magazine. . . .

As a result of an accident during my Ranger training I was hospitalized at Eglin AFB for an extended period. I was very close to forgetting many things I had learned in OCS but that good old standby, *Infantry*, came to my rescue. I was able to brush up on a few things I'd forgotten and also to keep up on current changes in doctrine and training. Now this might not seem to be an unusual letter as you probably get many similar in content, but you might like to know that many Air Force officers with whom I came in contact while at Eglin actually argued about who would get my issues of *Infantry* after I'd finished reading them. Many of these officers have become avid readers of *Infantry*. It gives them expert and official viewpoints on changes and developments in a branch of service which many of them supported closely in Korea and during World War II but about which they haven't had a chance to learn much. I could go on and say many more good things about *Infantry*. The only bad thing is that I have to wait three months between issues.

Robert L. Goldtrap
1st Lt, Infantry
Ayer, Mass.

It is especially gratifying to hear that Infantry *is of interest and help to members of other services. We are pleased if, in a small way,* Infantry *can help to promote better understanding and cooperation among the various members of our defense team. We hope that someday circumstances will permit more frequent publication.—Editor.*

Permanent Plan OK

Sir:

. . . my one hundred percent endorsement of your new permanent subscription plan. This is one of the best ideas I've encountered for many a day—and I'm on your list. . . .

An Infantry officer cannot afford to be without *Infantry*—the unit problems, the new ideas and theories are tops. Articles like those of General Wyman and General Bruce Clarke are invaluable both to the professional and to the civilian component officer.

Congratulations on your very long step forward. . . .

Richard L. Gillespie
Colonel, USAR
Cleveland, Ohio

We have been happily surprised by the tremendous response to the permanent subscription plan. For readers who may have missed the announcement, this is how it works: Permanent subscribers will be billed $2.25 each year until termination of the subscription is requested. This, of course, can be done at any time. The new plan insures continuous delivery of Infantry, *reduces paperwork at both ends and saves the subscriber money. Present subscribers may convert to the*

plan at any time. Merely ask the Book Department, U.S. Army Infantry School, to "make mine permanent." *The first bill will be sent upon the expiration of any subscription now in effect. Of course, new subscribers also may choose this plan.—Editor.*

NCOs Subscribe

Sir:

I have been a subscriber to *Infantry* for several years. It has been an invaluable aid to me in keeping up with new developments in my so-called "side line," an Infantryman in the National Guard. ... With the present emphasis on National Guard training, I felt that some positive action should be taken. I have therefore requested my NCOs to take advantage of this valuable training aid. You will find enclosed a check for fifteen subscriptions. ...

If possible, it is requested that these subscriptions start with the January issue of this year so that they may take advantage of the excellent article entitled "Battle Drill."

Gunnar G. F. Pedersen
Captain, NYNG
Brooklyn, N.Y.

Paragraph two complied with. Needless to say, your letter has added spark to the editorial staff. We'll do everything possible to provide material which will be useful in your training. We hope we will receive similar letters from other units. If we ever let you down in any way let us hear about that, too.—Editor.

Checklists Helpful

Sir:

I have looked forward to your series of articles entitled *"Checklists for Infantry Leaders."*

Leaders within the battalion have made extensive use of these lists and they have been invaluable in training.

Have you published similar lists for the battalion commander and battalion staff officers? If you have, will you please advise me as to the issue in which the list appeared.

If you have not published checklists for the battalion commander and the battalion staff, could you please advise me as to where I might find them, or if the Book Department sells such lists?

C. G. Dansby
Maj, Infantry
New York, N.Y.

We have not published checklists specifically designed for the battalion commander and staff. However, on page 97 of this issue you will find a list of troop leading steps which is appropriate for all troop leaders.

As you probably know, there will be no battalion in the new Infantry division. (See "Why Five?", April 1957 Infantry.*) While most of the checklists which we have published are applicable to the new organization, some minor revisions will be required. These will be consolidated and published in a future issue. We have mailed to you two items which may provide some of the material you desire.—Editor.*

More Issues Wanted

Sir:

... please renew my subscription to *Infantry* for the next three years. As a National Guard officer I look forward to each new issue as it is about the only source for information on the latest doctrine and techniques of the Infantry. I have read and reread many of the copies I have received in the past three years. My only regret is that it does not come out every month.

Roy L. Sodergren
1st Lt, Infantry MNG
Grand Rapids, Mich.

We, too, regret that Infantry *cannot be published monthly. However, since*

Continued on page 102.

WHY FIVE? PART II

Here is a "package" of related articles on the new pentomic

INFANTRY DIVISION

The April issue of *Infantry* carried an article on one of the most dramatic and significant changes in the long evolution of the Army—the reorganization of the Infantry division for atomic warfare. That article, entitled "Why Five?", discussed the *pentomic* concept (five-sided organizational structures with emphasis on capabilities for atomic warfare.) It also outlined the major features of the new Infantry (ROCID)[1] division which will replace the current Infantry division under the *pentomic* concept.

For readers who may have missed the basic article, and to refresh the memories of those who have read it, here are some of the important changes which have taken place in the Infantry division. The three regiments of the triangular division have been replaced by five battle groups. The battle group, with 1427 officers and men, is larger than the old battalion, smaller than the regiment it replaces. There are no Infantry battalions in the pentomic division. The battle group consists of a headquarters and headquarters company, four rifle companies (each with 243 officers and men) and a field artillery heavy mortar battery. Logistical and administrative support units are grouped under a new division trains headquarters. The division artillery has an atomic capability. There is no organic antiaircraft unit. A brigade headquarters and a transportation battalion with two armored carrier companies and a truck transport company have been added. Some units have been reduced in size and incorporated into other units. Units which normally provide direct support for the battle group such as the armor battalion, engineer battalion, 105mm howitzer battalion, forward communications company of the division signal battalion, ordnance forward support company, etc., also are organized pentagonally. While the overall strength of the division has been reduced

[1]Reorganization of Current Infantry Division.

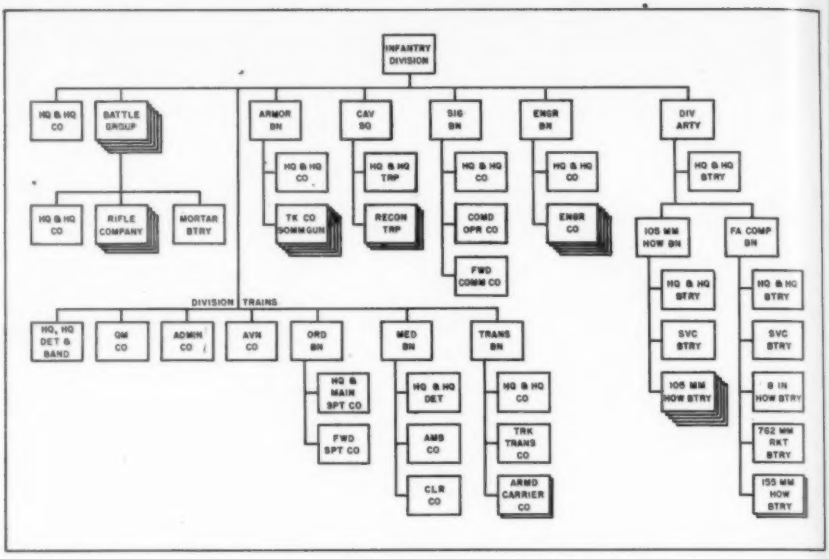


Figure 1. The new Infantry division — note that the names of several units have been changed since this chart appeared in the April issue.

from 17,460 to 13,748, the foxhole (riflemen in squads) strength has been increased by 453 men. Other changes brought about by the pentomic organization can be seen by looking at Figure 1.

The reasons for these changes are apparent. The Infantry division must be able to fight and survive on the atomic battlefield. This means that it must attack to exploit our own mass-destruction weapons and defend against enemy nuclear weapons.

To understand and appreciate these extensive changes we must consider the *effects* of atomic weapons. This subject has been discussed before in *Infantry*, in other publications and in training literature, but a very brief summary of atomic effects and other pertinent factors is presented here so that we may have them in mind as we discuss the new division.

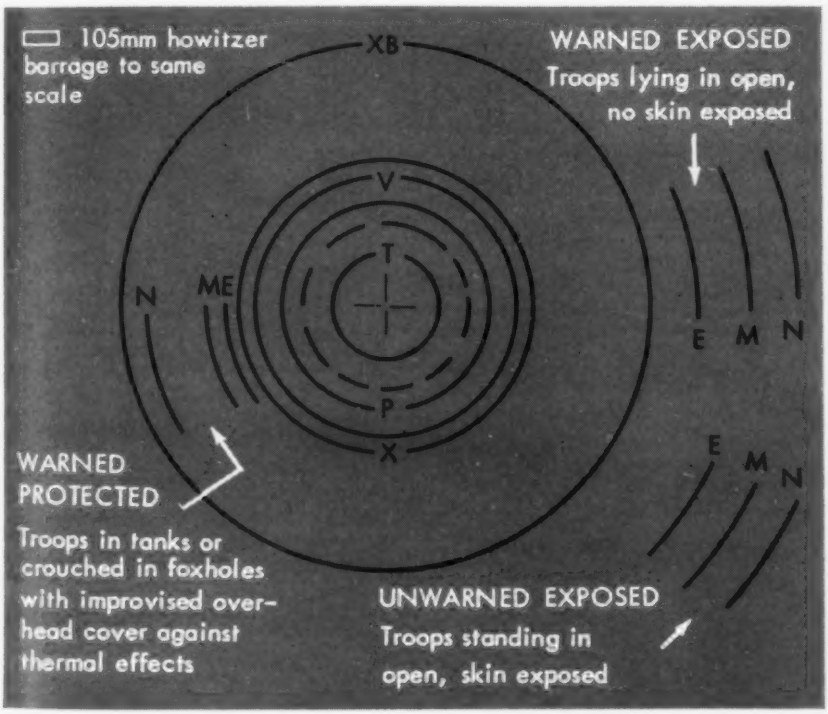
Normal chemical high explosives gain their energy essentially from a "rearrangement" of molecules in the substances involved. Atomic weapons gain their energy from the "fission," or splitting, of atoms. The energy released in the fission of a uranium 235 atom is 90,000,000 times greater than the energy released in the rearrangement of molecules in a chemical explosion. In spite of this great difference in force, the explosions of an atomic weapon and an ordinary high explosive are similar in one respect: both are caused by the rapid release of a large amount of energy in a small space.

Both the high-explosive and nuclear weapons are essentially blast producers—that is, a major portion of the total energy released by the explosion produces a shock or blast effect. The high explosive produces a small amount of heat in addition to blast; an atomic explosion produces large amounts of heat and nuclear radiation. Thus, the major effects of the atomic weapon are blast, heat and radiation; the major effect of high explosive is blast.

Figure 2 depicts the approximate radii of effects of a 20KT low-airburst atomic explosion. It also illustrates the atomic damage template used for atomic fire planning and determination of results of the nuclear explosion. The scale of this template (1:50,000) indicates that the XB circle (casualties to personnel exposed to burns) has a diameter of about 2.6 miles. A barrage of maximum width fired by a six-tube 105mm howitzer battery is drawn to the same scale to emphasize the power of the atomic weapon. A wide variety of yields may be used on the atomic battlefield; the 20KT weapon is selected for illustrative purposes.

(The bombs used on Hiroshima and Nagasaki approximated 20KT. The flash of this weapon seen from six miles is 100 times brighter than the sun seen from the earth's surface. A 20KT underground burst can throw more than a million tons of earth and rocks into the air; it can crater a hole 150 yards deep

Figure 2. Training template for map 1:50,000 showing radii of effects for 20KT low-air burst. Legend: T - moderate damage to tanks, Artillery, armored vehicles, Infantry weapons; P - casualties to personnel in tanks and foxholes; V - moderate damage to trucks and other unarmored vehicles; X - casualties to personnel in open with little flesh exposed; XB - casualties to personnel exposed to burns (low reliability since simple precautionary measures can prevent flash burns); E - emergency risk safety arc representing some loss of combat effectiveness to friendly troops but no deaths. M - moderate risk safety arc representing minor nuisance effect at worst; N - negligible risk safety arc, no appreciable effect on troops. Circles represent 50% probability of the occurrence of the indicated degree of damage. Dotted circle represents 2 roentgen per hour line resulting from neutron-induced gamma radiation from air burst. Moderate damage requires major repair effort to restore equipment to usefulness. Casualties are based on noneffectiveness within one hour.



and 170 yards across. Weapons organic to the pentomic Infantry division can fire weapons up to 100KT).

Three types of burst are used in ground operations: air, surface and subsurface. Low air bursts probably will be most commonly used because they provide the best over-all immediate damage to surface personnel and equipment targets and create less radiation hazards than surface or subsurface bursts.

Surface and subsurface bursts give smaller radii of effects for blast, heat and prompt radiation (emitted within 60 seconds after the explosion). However, they cause considerably more residual radiation (emitted by radioactive material deposited after an atomic burst) and downwind fallout. One hour after detonation a 20KT *surface* burst in a 15-knot wind produces approximately the residual radiation shown in Figure 3. Notice that there is residual radiation in two main areas: the mile-wide circle around ground zero and the five-mile ellipse of the fallout proper which forms downwind of the blast.

Although surface and subsurface bursts cause greater residual radiation hazards than the air burst, commanders must consider the circle of neutron-induced gamma radiation produced around ground zero by an air burst. Thus, troops marching at two miles per hour across an area hit by a 20KT low-air-burst weapon must remain (for an hour after the blast) at least 350 yards from ground zero to avoid receiving more than 25 roentgens.

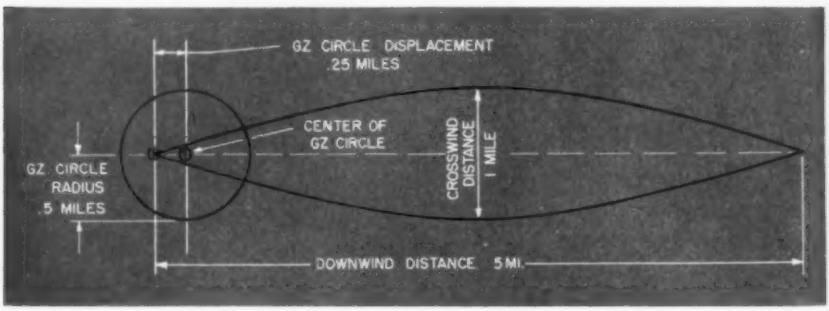
While templates, graphs and tables enable the commander *to approximate* the residual radiation hazard, radiac[2] instruments must be used extensively for exact on-the-spot checks of radiation intensity. Pentomic units have organic radiac instruments. A "command dosage" must be established to fix the maximum radiation which individuals will be allowed to receive.

Blowdown (blast-produced debris such as fallen trees and destroyed structures) and fires caused by atomic explosions may produce obstacles and hazards affecting the tactical employment of the riffle company. Flash blindness may last up to five minutes during the day and up to an hour at night.

With the organizational changes and atomic effects in mind, it is time to take a closer look at the pentomic division.

[2]Radiac: radioactivity detection, indication and computation.

Figure 3. Contours for residual radiation 1 hour after detonation of 20KT surface burst in 15-knot wind. Contours shown are for 300 roentgens per hour radiation. Three hundred roentgens cause vomiting and nausea in all personnel on the first day. All need evacuation by the end of a week. Twenty percent deaths may be anticipated. Survivors are ineffective for full military duty for about 3 months. G-Z (Ground Zero) circle is formed quite soon after detonation from heavy particle fallout, throwout and soil made radioactive by neutron bombardment. It displaces depending on velocity and direction of wind.



Tactics

PENTOMIC INFANTRY DIVISION

By Lt Col James W. Hungate

Reorganization of the Infantry division has required major revisions in our tactics. This was to be expected. Tactics have always changed as the means to wage war within an organization have changed. The invention of gunpowder, automatic weapons, the tank, the airplane, etc., have in turn affected organization and tactics for the battlefield.

New organization, changes in weapons and, particularly, the addition of an atomic capability in the new division have had a great impact on the tactics of subordinate units.

The pentomic division is designed to conduct operations in active atomic warfare or in situations not involving the use of atomic weapons but conducted under the threat of their use. In this connotation, active atomic warfare is warfare in which both sides use atomic weapons and the use of such weapons is considered normal. Nonactive atomic warfare

is considered to be warfare in which both sides possess atomic weapons, neither side has used them, the threat of their use exists in varying degree and they may or may not be used in subsequent phases of the war. It is impossible to predict accurately the relative probability of active and nonactive atomic warfare; however, emphasis must be placed on attaining optimum capabilities for active atomic warfare. A situation in which one side possesses atomic weapons and the other side does not is considered as exceptional.

Although the pentomic division is the result of much study, experimentation and some testing under simulated atomic conditions, we cannot assume that it will meet the ultimate requirements of an atomic battlefield without some refinement. Further testing and experience are certain to bring additional changes in weapons, organization and tactics.

Discussion of tactics for the subordinate units of the new division will, therefore, be limited to the means now available. Furthermore, in attempting to cover such a broad subject in a single discussion, we can deal only with basic concepts, doctrine and specific variations wherein changes in operational concepts, weapons, equipment and organization have occasioned changes in tactics for these units.

Before we consider specific tactics for the battle group of the pentomic division we should examine, briefly, some of the general requirements for Infantry operations under atomic conditions. These requirements have become apparent during studies at the U.S. Army Infantry School in the development of new doctrine and techniques for the subordinate units of the new division.

Dispersion. One of the most obvious requirements placed upon an Infantry unit of the atomic era is the ability to disperse in order to deny the enemy a lucrative atomic target and still remain effective enough to accomplish its mission. Dispersion is probably the cheapest form of protection from enemy atomic action. A criterion has been established that dispersion should be "maximum consistent with the accomplishment of the mission."

Concentration. Units on an atomic battlefield must mass combat power to accomplish certain missions. This concentration is as necessary now as it has been in the past; however, since an atomic weapon is in itself combat power, the use of these weapons plus greater mobility may reduce the number of personnel and units required to concentrate to achieve a given objective. Regardless of the number of personnel and units, the concentration must not be permitted to exist longer than is essential to perform the task at hand.

Mobility. To concentrate, accomplish a mission and then rapidly disperse, units must have good mobility—not necessarily in terms of miles per hour, but in speed of movement relative to that of the enemy and particularly with respect to the rapidity with which the enemy's atomic delivery means can react to targets of opportunity. The pentomic Infantry division has enough transportation, including armored personnel carriers (APCs), to mechanize two reinforced battle groups. In addition there are both limited organic and large-scale supporting air mobility means which may be made available from division or higher headquarters to increase the mobility of the battle group. Additional armored personnel carriers or wheeled vehicular transportation means from corps or field army may further improve the mobility of selected units. Unless there is some reinforcing transportation from outside the division, at least three of the division's battle groups normally will be restricted to foot mobility.

Control. Dispersion, swift reaction to capitalize on atomic strikes and the need for rapid implementation of orders places a heavy demand on control facilities. Communications must be rapid, reliable and capable of unfailing operation over extended distances.

Independence of Action. Basic combat units must be capable of independent action. This requires a unit which is logistically and administratively self-sustaining as well as an integrated tactical unit. This does not mean that it is anticipated that the battle group will operate without support from division since it must rely on its parent unit for atomic fires, artillery support, tanks and logistical support.

Atomic Support. In the past a commander normally developed a plan of maneuver, then tailored his fire support plan to aid in accomplishing the already determined maneuver. It is felt that in atomic conflict the commander may frequently determine the atomic support he will apply to any given operation, then tailor his plan of maneuver to exploit most expeditiously the effect of the nuclear weapons he will fire.

Posture on the Battlefield. Due to the circular area effects of atomic weapons, it follows that battle group formations which are linear in nature will, under most conditions, offer the best protection from enemy nuclear attacks. This is particularly valid in the offense where attacks may be made in column on separated axes when sufficient mobility is present. Conversely, the least profitable formations (those which incur greatest risk from enemy atomic attack) are those which present bulk both in width and in depth.

Battle Group

TACTICS FOR OFFENSE

By Lt Col James W. Hungate

With these general requirements in mind, attention may be focused on tactical considerations for the battle group in the offense.

A glance at the organizational chart for this unit (Figure 1, next page) reveals that unlike most of the other elements of the new division, the battle group has a "square" rather than a pentagonal organization. However, the fourth rifle company and a fourth platoon in each rifle company—one more than in the current triangular structure—give the commander more flexibility, allow him to retain a larger reserve when desirable and give him the capability of attacking on a wider front.

The mission of the battle group in the pentomic Infantry division is unchanged from that of the Infantry regiment in the

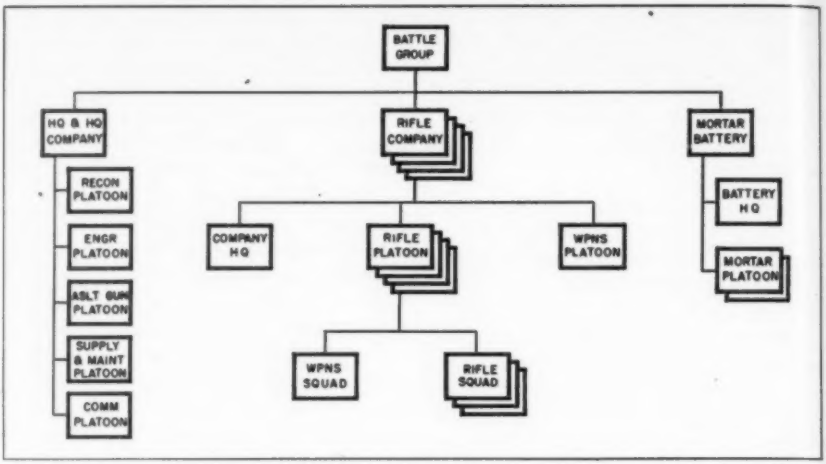


Figure 1. Battle group organization chart.

old triangular division: *To close with and destroy or capture the enemy*. The battle group attacks as part of the division, but is capable of independent action for limited periods. It accomplishes its mission by a combination of firepower, maneuver and shock action. Firepower is furnished by a combination of atomic and nonatomic weapons organic to or supporting the battle group. Rifle companies maneuver and engage the enemy in close combat. Shock action is the cumulative effect of the firepower and the assault of the maneuvering forces.

When the battle group commander receives a division attack order, he employs basic troop leading procedure. He makes a preliminary plan, issues a warning order, plans for the movement of his troops if pertinent and arranges to issue his order; with selected members of his staff, makes as complete a reconnaissance as possible; completes and firms his plan of attack and prepares the attack order; issues the order; and, finally, supervises its execution. In making his plans, the battle group commander should give particular attention to the following basic considerations which, while they are not hard and fast rules, should be applied to the maximum consistent with the situation:

Integration of plans of maneuver and fire support.

Minimum atomic target presented to the enemy.

Maximum flexibility.

Mobility—in relation to the mobility of the enemy.

Utilization of the terrain.

Mission-type orders to subordinates.

Exploitation of atomic weapons.

Retention of an adequate reserve.

Security.

Retention of the offensive.

Mass at the critical point followed by immediate dispersion.

Surprise.

The classic types of offensive action—the penetration, the envelopment, the double envelopment and the turning movement—are valid for the battle group. However, because of the wide area of damage caused by atomic explo-

sions, a penetration may be a more desirable form of maneuver than was general in the past, particularly when a nuclear weapon is used to break the enemy's shell of resistance. An equally preferred form of maneuver by the battle group commander may be the envelopment, provided:

The fighting is fluid.

The utilization of a company or companies in an envelopment can be implemented speedily.

The companies will not converge sufficiently to present a lucrative atomic target to the enemy.

The presence or absence of vehicular mobility, i.e., armored personnel carriers, for a unit in the assault has such an impact on the tactics of the Infantry battle group that any discussion of offensive tactics should be divided into "mounted operations" and "dismounted operations."[1] When APCs[2] are available, the battle group plans to fight highly fluid operations. Multiple columns may be employed to allow dispersion and still allow rapid concentration if necessary to accomplish the mission. When the battle group fights on foot its ability to disperse subordinate units widely, and still concentrate them rapidly, is reduced.

Mounted Operations

In considering mounted operations it is assumed that the battle group has sufficient armored personnel carriers to lift all its foot elements. The plan of maneuver is integrated with the plan of fire support to take maximum advantage of both atomic and nonatomic fires. The plan of maneuver aims at reducing the battle group's vulnerability to enemy countermeasures (atomic or otherwise), and may be directed toward seizing terrain, forcing the enemy to mass into a lucrative target for our atomic strikes or at destruction of enemy troops. Battle group objectives will be relatively deep as compared with objectives assigned in the past. Intermediate objectives will be kept to the minimum consistent with necessity for coordination.

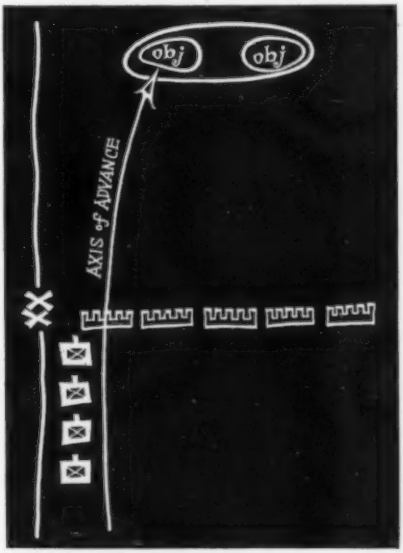
Mounted-operation attack formations should be based either on a single column or several adequately separated columns. If more than one column is used the axes should be separated widely enough to reduce the effects of an enemy atomic strike on one axis, yet near enough to permit rapid shifting of forces from one axis to the other. The column formation (Figure 2):

Permits a maximum of flexibilty.

Presents a minimum atomic target to the enemy.

Permits an adequate force forward to engage the enemy initially while retaining the bulk of the force for the most profitable subsequent employment.

Figure 2. Attack on a single axis.



[1]Air-transported operations, another subdivision of battle group offense, will be discussed in a later issue of *Infantry*.

[2]See "Chariot for the Queen," October 1956 *Infantry School Quarterly*.

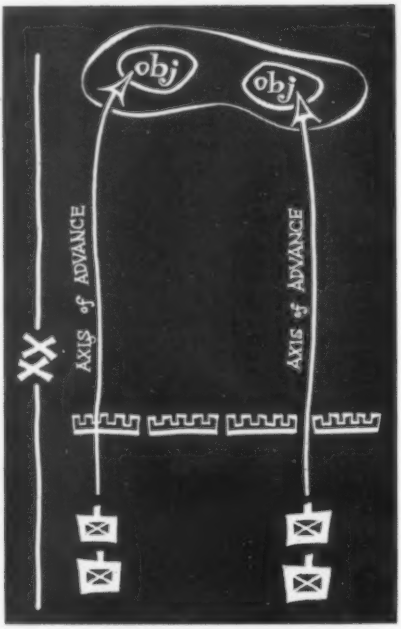


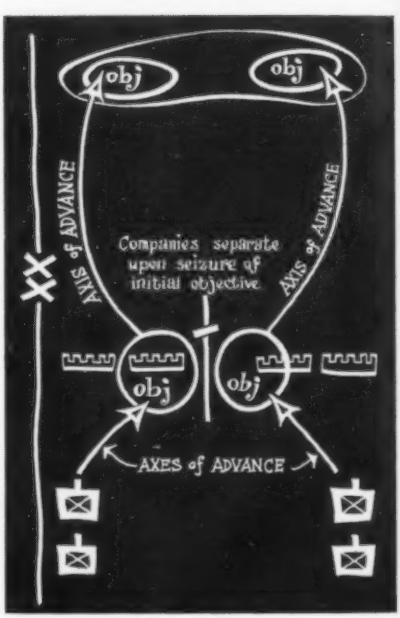
Figure 3. Attack on multiple axes (companies not required to mass).

Multiple axes may be used when adequate fire support, including atomic weapons, is available to breach the enemy shell of resistance at more than one point. Lateral road nets sufficient to permit rapid shifting of forces from one axis to the other are desirable (Figure 3). A variation of the multiple axis, where forces need not concentrate on the objective, is the multiple axis where mass (concentration) must be achieved on the objective. (Figure 4 shows an example of two axes converging on an intermediate objective; however, the convergence could be on the final or any other objective.)

The battle group should seldom use more than two separate or converging axes in mounted operations. Formations on three or four axes reduce the flexibility of the command and unduly divide available fire support. This concept does not preclude the utilization of the entire force, if necessary, in the final seizure of the objective.

In mounted and fluid operations the preferred method of controlling the attack is by assigning a line of departure and an axis or axes of advance. These control measures give maximum flexibility to subordinate commanders and still retain adequate control at battle group level. Intermediate objectives should be kept to a minimum and used only when necessary to coordinate the attack, to facilitate control or when certain terrain is vital to the successful completion of the mission. The battle group commander subdivides the final objective into company objectives consistent with the need to seize and control the objective assigned by division.

Figure 4. Attack on multiple axes (companies required to converge on intermediate objective).



A change in the organization of the pentomic Infantry division which will have a major effect on tactics of the battle group is the artillery support available for the battle group. The organic mortar battery, now a field artillery unit manned by field artillery officers and enlisted men, is the organic artillery of the battle group. This battery furnishes forward observers to the four rifle companies, and fire requests will feed from the forward observers directly to the mortar battery. Requests for additional fires will go through the mortar battery to division artillery. The mortar battery, with two platoons of four 4.2-inch mortars[3] each, will be reinforced habitually by the fires of a 105mm howitzer battery of six tubes, with the primary consideration in location and employment of this battery being its ability to provide continuous support to the battle group. The mortar battery commander is the fire support coordinator for the battle group commander. It is preferable in the offense to use the mortar battery in general support wherever range considerations do not dictate dividing the platoons. Such division may be necessary when operating on more than one axis.

When atomic fires are available, they are the basis around which all other fires are planned. Priority of supporting fires is given to the main attack when more than one company is in the attacking echelon.

It will be normal, where terrain permits the use of tanks, for division to attach a tank company or companies to battle groups in contact with the enemy. Tanks, when attached, are generally used most frequently in the assault echelon; a tank company may be used as the nucleus for a tank-Infantry team to spearhead the battle group advance.

As the result of a recent change the assault gun platoon of battle group headquarters and headquarters company is equipped with four M-48 90mm gun tanks for primary use in an antitank role. Eventually these will be replaced by an extremely accurate AT guided missile, the Dart.[4]

In the offense the assault gun platoon's primary mission is antitank protection for the battle group. The platoon will usually be in general support except when the platoon or a section of it is attached to a company-size task force or when companies are so widely separated that direct support or attachment are necessary.

The reconnaissance platoon of the battle group, organized like the reconnaissance platoon of the old division reconnaissance company, has considerably more capability than the old regimental intelligence and reconnaissance platoon. It can perform missions of screening as well as reconnoitering. The platoon may be used to screen the flanks of the advancing battle group. If one flank contains a more serious threat, the entire platoon may be used on that flank. In such a case, the mission of screening the remaining flank should be delegated to one of the reserve companies.

When conducting mounted operations, the assaulting companies move to the objective or as close to the objective as possible before dismounting. They engage the enemy in close combat, destroy him quickly, and either disperse widely to protect the objective or quickly resume the advance to maintain the momentum of the attack.

Reorganization is continuous. However, specific halts to reorganize are avoided because of the danger inherent

[3]The 4.2 mortars may be replaced by 105mm mortars when they become available. The 105s are now under test.

[4]For more about the Dart see "What's New for Infantrymen," January 1957 *Infantry School Quarterly*, and page 34 of this issue.

Lt Col James W. Hungate began his military career when he received a direct commission in 1942. During World War II, he served briefly with the Armored Replacement Center at Fort Knox and with the 68th Tank Battalion at Camp Cook before entering combat in the Pacific Theater. Col Hungate was separated from the service after the war but returned with a regular commission in 1947 as an instructor at The Infantry School. He then spent two years as a student at The Infantry School and the Command and General Staff College. Following a three-year tour of duty in Austria with the 350th Infantry and G3 section of United States Forces, Austria, he returned to his alma mater, Washington State College, as an instructor. In 1955 he went to Korea where he commanded a battalion in the 7th Infantry Division. Later he became commandant, I U. S. Corps NCO Academy. Last September, Col Hungate rejoined the staff of the United States Army Infantry School and is now chairman of the regimental committee, Tactical Department.

in stopping or slowing the operation. Plans for consolidation on the final objective are made concurrently with attack planning. These plans must be consistent with the mission of protecting the objective without presenting a likely atomic target to the enemy.

Dismounted Operations

Dismounted operations include fighting under atomic conditions where the mobility of the battle group is restricted to that of the foot soldier. This applies to all movements on the battlefield, from the area from which the assault is launched through the objective. This restricted mobility may be from one extreme where the entire battle group is fighting on foot, to semi-mobility where one or more companies are motorized, with the remainder of the battle group fighting on foot.

Since the division cannot provide organic mechanization for all its Infantry units, the division commander may decide to commit certain battle groups without vehicular mobility when:

The terrain is such that the use of vehicles is unprofitable, i.e., jungle or mountain.

The battle group is making a secondary attack.

The battle group is making a limited objective attack.

The battle group is making a night attack.

Expected enemy resistance will permit rapid movement on foot.

The area in which the battle group will operate does not present a radiation hazard.

The attack is not expected to bring an enemy atomic reaction—such as a mopup action in an area where we have expended an atomic weapon.

Dismounted formations will more nearly approximate those of our current concepts because, without mobility, swift convergence of mass on the objective is more difficult. Attacks in column should be less normal than in mounted operations, and should be used chiefly when the enemy situation is vague or when it is determined that the result of our atomic strike will leave little or no effective enemy resistance.

In atomic warfare speed of movement is always important. Any formation which facilitates speed, without sacrificing security, should be used.

If atomic support is limited it may be advisable to use two companies in the assault. This would increase the speed of the operation yet retain flexibility with a sizeable reserve. When adequate atomic

support is available, wider frontages may be used and three companies may be employed in the assault. This would enhance speed of the operation, but limit the commander's flexibility. Three companies also may be employed when the attack is against a limited objective. The use of four companies in the assault should be the exception since it would deprive the commander of flexibility. If the situation does dictate the utilization of four companies in the assault, the commander must make provision for a temporary reserve from other elements of the battle group, and an adequate reserve will be reconstituted as soon as the situation permits.

The criteria of "maximum dispersion consistent with accomplishment of the mission" is as valid for dismounted operations as it is for mounted operations. However, because of the restricted mobility of foot troops, the subordinate elements of the battle group in a two-company or three-company assault may be in such close proximity that control measures of a more restrictive nature must be used. As a consequence foot attacks most frequently will be assigned lines of departure and zones of action. Intermediate objectives, although held to a minimum, may be more frequent than in mounted assaults. Objectives will still be deeper than in nonatomic warfare, but not as deep as in mounted operations.

Another limitation is imposed by the lack of mobility in dismounted assaults. Attacking echelons on foot cannot as easily bypass enemy resistance.

Reserves are utilized as under the present concept, with an added emphasis on flank protection since wider frontages and greater dispersion of the attacking forces will result in greater gaps between units.

Care must be taken in committing the reserve to avoid massing sufficiently to present a remunerative atomic target to the enemy.

Mortars and antitank guns will usually be used in general support of the attack. This will be facilitated in foot operations since distances laterally may not be as great as in mounted actions. Tanks from the armor battalion should be attached to the attacking company or companies and are rarely held in reserve. The reconnaissance platoon has missions similar to those in mounted operations, and the engineer platoon of battle group headquarters company is employed to support the entire battle group.

The battle group commander may take any or all of the following measures to reduce the unit's vulnerability to atomic weapons when it attacks on foot:

Attack at night.

Utilize smoke in mass.

Infiltrate through the enemy's forward defenses to reach the assault position without forming an obvious atomic target.

Use massed firepower, including atomic fires, on enemy positions with emphasis on destroying the enemy's ability to control, direct or deliver atomic fires.

In the conduct of the attack, atomic weapons should be fired when the assaulting units are as close to the enemy as possible. An attack on foot poses a problem in the matter of atomic fire support since the vulnerability of foot troops to atomic weapons and their comparative slowness of movement may result in placing our atomic fires too far in front of the attacking units to be exploited rapidly. This may be resolved in part by the use of small-yield weapons. Radiation teams to accompany the assaulting foot units are particularly important as radiation may present a formidable hazard to troops moving on foot.

Once contact is gained it is vital that the attack move vigorously and that

pressure against enemy forces be continuous. This creates what has been termed "hugging tactics"—rapid engagement of successive enemy positions in close combat—to make it more difficult for the enemy to place atomic fires on attacking units without endangering his own troops. Consequently, a minimum of delay on intermediate objectives is allowed and each succeeding attack is pushed with the same vigor as the initial assault. An alternate technique would be to make contact with the enemy until his position has been developed sufficiently to locate a target or targets for atomic weapons. The attacker then would redispose his force—in effect, pull back—sufficiently to allow the employment of low yield atomic weapons to destroy the located targets.

As in mounted operations, action after seizure of the final objective is planned concurrently with the plan of attack. Units disperse beyond and to the flanks of the objective to protect the area from a counterattack, or to reorganize for continuation of the attack if pertinent.

Nonatomic Warfare

Offensive operations of the battle group in nonatomic warfare are similar to those described for dismounted operations in atomic warfare. However, the elimination of atomic weapons results in some differences in planning and conduct of the offensive. Techniques for mounted operations in active atomic warfare are valid in nonatomic warfare when strong enemy positions have been breached or when a successful envelopment or turning movement becomes possible.

While terrain is always important, it becomes increasingly important in nonatomic warfare because of the commander's inability to deliver atomic weapons on dominating terrain and then bypass or move freely through or near such terrain. In nonatomic warfare it becomes necessary to neutralize enemy observation from dominating terrain by physical assault. This usually is accomplished by attacking along ridge lines running into dominating positions and seizing successively higher ground.

In the absence of atomic support, the commander bases his formation on different criteria. The following factors favor a formation with one rifle company in the attack echelon (attack in column), when:

1. The enemy situation is vague.
2. One reinforced company provides a preponderance of force over the enemy.
3. The dominating terrain on the objective can be seized by one company.
4. The usable portion of the battle group zone is narrow or lacks maneuver room.

Two companies may be used in the attack when:

1. The enemy situation is relatively obscure but the terrain makes it advisable to use more than one company.
2. Two companies are necessary to provide a preponderance of force.
3. Terrain features or the objective dictate the use of two companies to seize and dominate the ground.

Three companies may be used in the attack when:

1. Enemy strength makes such a formation necessary to provide preponderance of force.
2. The terrain feature assigned as an objective requires an attack by three companies.
3. The zone of action has appropriate objectives and is wide enough for adequate maneuver room.

(It must always be remembered that use of three companies in the initial assault weakens the commander's reserve and reduces his flexibility.)

An initial attack formation with four companies in the assault will be used only in exceptional circumstances such as a mission to seize a limited objective, or when conditions of visibility (such as

a night attack) would hamper the employment of a reserve.

Without atomic weapons, the penetration becomes more difficult and commanders should seek to use the envelopment as a more desirable form of maneuver. Although fronts may be narrower in nonatomic warfare than under conditions of active atomic use, excessive concentrations still should be avoided to protect the unit from the enemy's use of nonatomic weapons in mass and from the surprise use of atomic weapons.

In conduct of the attack under nonatomic conditions the battle group commander has more freedom to commit his reserve in close proximity to companies making the initial attack. The reduced enemy atomic threat in nonatomic warfare also allows the unit to spend more time on the objective in the reorganization, and removes the necessity for immediate dispersion after seizure of the objective.

NOTE: *Battle group tactics for the defense will be discussed in the next issue of* Infantry.

Rifle Company

By Capt Thomas H. Jones **TACTICS FOR OFFENSE**

The great power of atomic weapons creates a need for unprecedented dispersion and mobility for the rifle company. It emphasizes passive and active measures designed to minimize effects of enemy atomic weapons and to provide security for extended units. To meet these requirements, an organization of increased capabilities was needed. The rifle company of the pentomic division, depicted in Figure 1, next page, is the answer. Some of the changes in this company are immediately obvious. A fourth rifle platoon has been added. Rifle squads of 11 men are organized with a squad leader and two balanced fire teams of five men each, for greater control and more efficient fire and maneuver. The 60mm mortars and 57mm rifles of the weapons platoon have been replaced with 81mm mortars and 106mm rifles. Two ammunition bearers are provided in the weapons squad to supply the LMGs or 3.5-inch rocket launchers as required. This organization increases the capabilities of the rifle company in three important areas: mobility, firepower and communications.

Mobility. The weapons platoon is completely motorized. The two armored carrier companies and the truck transport company in the new division transportation battalion mean more frequent motorization of all or part of the rifle company.

Firepower. The weapons platoon with two 106mm rifles and three 81mm mortars has greatly increased range and

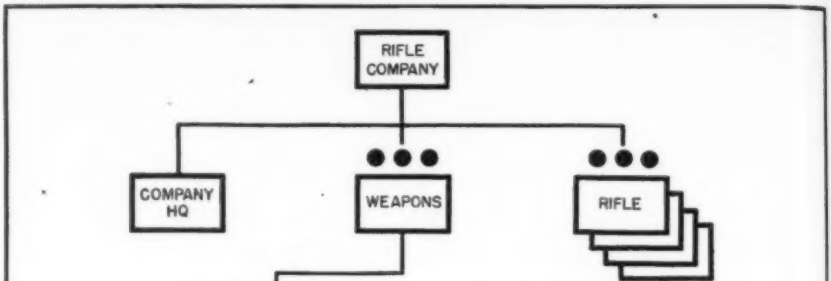


Figure 1. The rifle company.

power. Each rifle platoon has two 3.5-inch rocket launchers and the entire company has 12, as compared with three formerly. The addition of another rifle platoon and two men to each rifle squad increases the firepower and flexibility of the company considerably.

The basic mission of the new rifle company in the attack remains the same as that for the rifle company in previous organizations—*to close with and destroy or capture the enemy*. Offensive principles of fire and maneuver retain their validity; however, the tactical effects of atomic weapons on the company are far reaching.

Before we discuss specific concepts and doctrine for this new company's operations we should review, briefly, some of the *general considerations* which will affects its employment.

Dispersion. The atomic battlefield requires that the company achieve maximum dispersion consistent with the accomplishment of the mission. The rifle company becomes more dispersed in the attack, particularly when mobile, converging its platoons onto objectives at the last possible moment to achieve the necessary assault power. The column formation is used extensively.

Security. To decrease the possibility of location and destruction by enemy atomic weapons the company relies heavily on the use of covered and concealed routes, movement by night or under other conditions of reduced visibility, and on movement by infiltration. Night attack is emphasized, and smoke is used extensively to cover operations or to deceive the enemy. The increased isolation of the company increases the reconnaissance and security measures necessary to prevent surprise by the enemy throughout the conduct of the attack. Movements are as continuous as possible. Armored vehicles when attached to the company provide some protection from atomic effects.

Mobility. One of the most effective methods of avoiding hostile atomic fires is to close with the enemy so rapidly that he cannot effectively use these fires without endangering his own troops and materiel. Mobility allows this rapid advance.

The rifle company will frequently utilize armored personnel carriers and trucks for this purpose. Atomic war is also characterized by deep objectives and a need for rapid convergence of maneuver elements, followed by quick separation of these elements and aggressive exploitation of atomic strikes. Again, mobility will permit the effective use of these tactics. The probable high degree of enemy mobility is another factor necessitating friendly mobility. The engagement of lucrative enemy atomic targets during the attack may necessitate rapid shifting of friendly forces in close proximity to these targets. Pursuit of fleeing enemy also demands mobility; helicopters are used for this and other operations.

Flexibility. Fluid, fast-moving situations and sudden changes in mission demand flexibility of the rifle company. Planned routes or objectives may be blocked by radiation and blowdown caused by atomic explosions. Enemy threats to flanks or rear areas demand quick reaction. Sudden assumption of the offense after a defensive engagement is common. The rifle company performs a variety of missions as the nucleus of a task force and forms task forces of its own. It may be attached to a tank unit in pursuit or exploitation.

Maneuver. The rifle company is often assigned deep objectives and an axis of advance. Intermediate objectives are used infrequently since they tend to slow the attack. Assembly areas, if needed, should allow considerable dispersion by the company. Enemy elements are frequently bypassed and eliminated by reserves and fires (nonatomic and/or atomic) of higher echelons. The maneuver plan is made with due consideration to atomic radiation and blowdown; concealed routes are sought. Frequently, the maneuver plan is designed to develop atomic targets; for instance, the company attacks to determine the location and degree of concentration of enemy forces, and then bypasses or withdraws to allow atomic strikes on those forces. Maneuvers also may be designed to force the enemy to mass into concentrated atomic targets. Rapid exploitation of atomic fires is a basic element in the determination of maneuver plans. While dispersal is highly desirable, the degree of dispersal must not seriously risk defeat in detail. The battle group converges companies only when essential to the accomplishment of the mission and separates them quickly. Atomic weapons make the penetration a more desirable type of maneuver than in nonatomic war since they provide a means for creating gaps in enemy positions. Continuous movement is desired to minimize atomic vulnerability with reorganization frequently accomplished during movement. Night attacks, while commonly used to achieve surprise and avoid atomic fires, are nevertheless hindered by the confusion and flashblindness resulting from enemy atomic strikes at night, and by the great difficulties to movement at night posed by atomic destruction and radiation hazards. Adequate antiatomic dispersion and deep objectives are difficult to attain at night. Dominating terrain remains the most frequent objective for the company, but since atomic strikes are frequently used on this type of terrain, the radiation may cause the company to be assigned less dominating but safer ground as an objective.

Fire Support. In the attack, scheduled, on-call, and target-of-opportunity atomic fires are used. Scheduled fires are most frequently used on the enemy's forward positions and his immediate rear; on-call fires for deeper positions. Atomic fires on enemy in less than company strength is generally considered unremunerative; however, the mission may require this use. Decisiveness is the key in using

CAPT THOMAS H. JONES, an instructor in platoon and company tactics at U. S. Army Infantry School, enlisted in the Army in 1943 and was an intelligence scout with the 78th Infantry Division in Europe during World War II. He received an OC commission at Fort Benning in 1945, following which he was assigned to an AAA battery at Fort Bliss and later to the 2d Armored Division at Fort Hood where he served as a company commander. He was a reconnaissance platoon leader and company commander with the 1st Cavalry Division in Korea. In 1952 he served in the G3 Section, OCAFF, and then completed the advanced course at the United States Army Infantry School. After a tour as assistant G3 with the military advisory group to Saudi Arabia he studied Portugese at the Army Language School. Capt Jones began his current assignment in July 1956. This is Capt Jones' second appearance in *Infantry*. He coauthored "Small Unit Task Forces" in the October 1956 issue.

atomic fires. The company commander plans his fires for close support of the attack and on enemy outside the atomic effect radii. Fires also are planned to prevent enemy reinforcement of atomic-striken areas. However, the possibilities of sudden nonavailability of atomic support, effects less than expected, or atomic duds make plans for the use of nonatomic fires in planned atomic target areas mandatory. Also, troop safety and the danger of creating obstacles along routes needed for maneuver may make atomic fire inadvisable. The company may request atomic fires but echelons higher than battle group retain the authority to fire them. The delivery time required for atomic fire on targets of opportunity makes the use of nonatomic fires essential in many situations.

Intelligence. The effective use of atomic fires depends heavily on good intelligence. The rifle company, properly trained, is one of the most effective sources of tactical intelligence. All pertinent information of the enemy and terrain must be reported by the company so that profitable atomic targets are located and destroyed.

Offensive tactics of the rifle company, like those of the battle group, should be considered under conditions when the company has vehicular mobility and when it must engage in combat on foot.

Mounted Operations

When armored personnel carriers are attached to the company, the maneuver plan is designed to take full advantage of their speed, firepower and shock action. The column formation is often used in the initial stages of the attack because of the advantages it offers in flexibility, speed, low atomic vulnerability and control. The platoons needed to seize the objective deploy rapidly from this formation.

The operations of a reinforced rifle company with carrier mobility have many of the characteristics and employ many of the techniques of mobile task force operations, discussed in "Small Unit Task Forces," October 1956 and January 1957 issues of the *Infantry School Quarterly* (now *Infantry* magazine).

In allocating personnel carriers tactical integrity is maintained and routes suitable for their movement are chosen. Personnel remain loaded until actual or expected enemy action forces them to dismount. Enemy antitank weapons are the major threat. Troops may dismount for the assault, or prior to it, if forced by enemy action to do so, or they may be

able to ride onto the objective, particularly if accompanied or led by tanks, possibly under artillery time fire. The senior Infantryman aboard is vehicle commander and mans the .50-caliber machinegun mounted in the turret. When the troops dismount drivers or other designated personnel man the guns. The APCs either follow the dismounted Infantry by bounds or move forward to designated positions when called for by the commander of the transported unit.

Ammunition and other supplies carried by the APCs are extremely useful during consolidation or for continuing the attack. The company commander must make provision for refueling and maintenance of the personnel carriers. The mobility afforded by these vehicles is of great value in the conduct of reconnaissance, security, pursuit and task force operations and in avoiding enemy or friendly atomic fires. Also, each squad of nine APCs has two AN/GRC 8 radios which augment the company radio net.

In employing the weapons platoon to support the company mounted in APCs, the company commander must consider that the wheeled vehicles organic to the weapons platoon cannot traverse certain terrain trafficable only to the tracked armored personnel carriers. In fast-moving situations, the mortars may follow on carrier and set up when fires are called for.

A dismounted rifle company may often be assigned a zone of action. As a guide, a rifle platoon may attack on a frontage of up to 300 yards. Because of the necessity for a rapid attack on an objective, the rifle company will not be required to clear its zone of action unless specifically ordered to do so or unless bypassed resistance would jeopardize the success of the attack. Zones of action may be assigned to attacking platoons by using easily recognizable terrain features. The company commander may select a tentative assault line (formerly called assault position), preferably within 150 yards of the enemy positions.

The rifle company may attack with one, two, three or, in exceptional situations, with four platoons in the attack echelon. Platoons, or elements thereof, not in the attack echelon constitute the reserve. The mission, terrain, enemy, reinforcements, supporting fires and width of the company zone determine the formation. The company commander selects a formation which most nearly meets the combined requirements of all these factors.

A formation of one platoon in the attack and three platoons in reserve is suitable where the enemy situation is obscure (or the enemy is known to be weak), where the company has a narrow zone, where a very high degree of control is necessary, where one or both flanks are exposed, where the distance from the LD to the objective is great and/or where terrain limits lateral dispersion. Two platoons in the attack and two in reserve provide considerable firepower to the front and allow the retention of a sizable reserve. This formation is suitable when the enemy situation is only fairly well known (or it is expected that two platoons will provide sufficient assault power), when one or both flanks are exposed or when the terrain and the distance from the LD to the objective necessitate fairly close control. Also, no more than two platoons are normally used in the attack if the zone of action of the company is 500 yards or less since excessive concentration would result. A formation of three platoons in the attack and one in reserve provides great firepower to the front and still retains a reserve of sufficient strength to influence the action. This formation is used when there is relatively detailed knowledge of

the enemy, where the distance from the LD to the objective is not great and the terrain allows considerable lateral dispersion and/or where the company flanks are relatively secure. No more than three platoons are used if the company zone is 750 yards or less. A formation of four platoons in the attack is rarely used in daylight since it does not provide an adequate reserve to exploit or otherwise influence the action or to provide security. It may be used when the width of the objective is extreme, when the objective is very close to the LD, when the company flanks are secure or when detailed enemy information is available. It may also be used to clear rapidly a large objective following a friendly atomic detonation, when attacking at night or when making a river crossing.

The reserve platoons in the attack may be assigned one or more of the following missions: attacking from a new direction, taking over the mission of an attacking platoon, protecting one or both flanks of the company, maintaining contact with adjacent units, mopping up a position, protecting the reorganization and consolidation, or assisting the assault echelon by fire of the machineguns of the weapons squad.

The 81mm mortar squads are usually used in general support of the company attack from a centralized location. This employment permits effective massing and shifting of fires and eases resupply. Mortar squads may be attached if a rifle platoon is beyond effective supporting range or if terrain reduces the company commander's control of his platoons and mortars. The mortars fire effective close support at ranges up to 2000 yards, then displace, preferably by squad echelon, when the range to objectives or other likely target areas becomes excessive.

The antitank squads, usually in general support for greater flexibility, are used primarily to engage enemy tanks, and secondarily to fire on pillboxes, crew-served weapons, grouped personnel or other definitely located point targets. An antitank squad may be attached to a semi-isolated platoon such as a platoon performing a flank security or advance party mission. The antitank squads support the attack, frequently from widely separated positions, and displace to the objective when fires are masked. They also may provide antitank flank protection to the company.

The company avoids dangerously radioactive areas and, if radiation hazards exist, personnel with radiac instruments move with lead elements in the formation. Higher headquarters prescribes the allowable radiation dosage for individuals.

NOTE: *Rifle company tactics for the defense will be discussed in the next issue of* Infantry.

The entire officer corps of the Army must now change its way of thinking. It must learn quickly and absorb the new concepts, tactics, and techniques necessary to make these new pentomic structures work. For example, the division commander who once had only three regiments to direct now has five battle groups. There is no complacency about the finality of our newly developed structures and concepts. We think we have good interim solutions, but we are sure that they will soon be modified by experience. There must be no closed minds in this business; we must encourage imagination and creative thought in the search of better solutions.

GENERAL MAXWELL D. TAYLOR
Chief of Staff, U.S. Army

ROCID

Firepower

PENTOMIC INFANTRY DIVISION

When you try to determine the comparative firepower of the Infantry weapons in the pentomic division and those in the old triangular division, do not base your analysis on numerical differences of men and weapons alone. The result might be interesting to a statistician, but it would be of no practical use to an Infantry commander at any level. A numerical comparison of weapons in the two divisions would show you that the old division had 1.21 weapons per man and the new has 1.20 weapons per man, or .01 weapon per man less. The infinitesimal difference does not seem worth considering. It isn't.

The new division is built around atomic weapons and we cannot make a comparison of firepower in the new and old without taking them into account. We must throw into the balance the pentomic division's *atomic* firepower — the 8-inch shells and Honest John rockets— as well as the support available from

corps and army. We must never lose sight of the fact that these weapons support everyone in general and rifle elements in particular. It is not expected that their use will be limited only to emergencies. They will be used, adequately if not lavishly, to clear the way for Infantry units—to make their mission more certain of success.

If you take the time to study the TOEs,[1] you will feel a surge of satisfaction when you find that there are 228 M-1919A4 machineguns in the new division while there were only 102 in the old division. Your feeling of satisfaction is likely to be shortlived when a further check shows you that the new division does not have a single M-1917A1, twin 40 or quad 50 machinegun, nor does it contain a 60mm mortar, 57mm or 105-mm rifle. At this stage of comparison you will probably feel that you have lost much more firepower than you have gained. But you are basing your decision on comparative *numbers* of weapons and apparent losses. Much more significant is where the Infantry weapons are located in the new organization.

The twin 40 guns and quad 50 machineguns that are now missing in division have been pooled at corps. The 60mm mortar and 57mm rifle are gone, but each rifle company has acquired three 81mm mortars and two 106mm rifles. These heavier weapons do much more than just fill the gap.

By continuing the analysis in this way you will see that pentomic units have been noticeably increased in firepower. This is the case even with weapons, such as the M-1919A6 machineguns and M-1 rifles,[2] which show smaller totals in the ROCID TOE.

For example, there are eight M-1919A6s in the rifle company. There were only six to a company in the triangular division. As for the M-1 rifle, there were 8060 in the old division, while there are only 7480 in the new. Yet there are 453 more riflemen in the squads of the pentomic division than in the squads of the old division, or 51 more in the new rifle company than in the old one. There are still two automatic rifles[3] in each rifle squad.

There were 550 3.5-inch rocket launchers in the triangular division and there are 569 in the new division. The 19 additional rocket launchers do not seem to represent an impressive increase of firepower. But the old rifle companies had only three of these launchers, one in each platoon headquarters. The new rifle company has 12 of them: two in company headquarters, two in the weapons platoon headquarters, and eight in the weapons squads where they will do the riflemen the most good. You can recognize this as a tremendous increase of rifle company firepower in this particular category.

Each of the five battle groups in the pentomic division has a mortar battery with eight 4.2-inch mortars. These batteries give the new division 40 heavy mortars compared to the 36 found in the triangular division (12 in each regimental heavy mortar company). Each rifle company has three 81mm mortars. The new division contains 74 81s, compared to the 58 of the old division. In considering these gains in mortar firepower, however, do not forget that the 81 60mm mortars of the triangular division have been dropped from the ROCID TOE.

The battle group will receive antitank protection from 106mm rifles (two in each rifle company) and from M-48 90mm gun tanks (four in the assault gun platoon of battle group headquar-

[1]Tentative. TOEs are available in limited quantities to units as they are to be reorganized. Finalized TOEs are not expected until early in 1958.
[2]Department of the Army recently announced the adoption of a new rifle, the M-14 which will replace the M-1.
[3]A new rifle, the M-15 will replace the BAR.

ters and headquarters company).

You can see that several heavier weapons as well as the greater quantities of other weapons at rifle company level represent a real increase in firepower, not just an apparent increase.

But it is only when you contemplate the probable employment of the new division *without* its atomic weapons that you are likely to have any real misgivings as to the adequacy of its firepower. We can only repeat here that the division's organization is based on incorporating the best attainable dual capability (atomic/nonatomic) but with emphasis on requirements for atomic warfare. Its atomic weapons are an integral part of it and must be so considered.

Aside from the division's atomic artillery, most of its current weapons are familiar to every experienced Infantryman. Nevertheless, because of the Army's continuous effort to improve its old weapons and to develop new ones to meet the ever-changing requirements of ground warfare, there probably will be other changes in ROCID TOEs in the future. Even while this article was being written the Army adopted as standard the new M-14 and M-15 rifles to replace the M-1, carbine, submachinegun and BAR. Limited quantities of the new rifles have been produced for test purposes. Money for greater production probably will not be available until 1958-59, and troop units probably will not begin to receive the new rifles until 1960.

The pentomic division's new weapons exemplify the Army's aim of increasing firepower and effectiveness while decreasing bulk and reducing weight. Let's take a brief look at some of the more recently developed weapons which will help to provide the firepower of this division.

M-14 and M-15 Rifles

Department of the Army has announced the adoption of two new rifles, the M-14 and the M-15 which will replace the M-1, the BAR, the submachinegun and the carbine.

These new weapons are the results of years of experimentation, revision and testing. Along with the recently adopted all-purpose M-60 machinegun, they are a part of a new, streamlined weapons system.

Actually, the M-14 and M-15 may be considered as one rifle. They are identical except for several interchangeable components. There are two barrels for this rifle, a light and a heavy. With the lighter barrel, the rifle is designated the M-14 (Figure 1). It weighs 8.7 pounds and does the work of the carbine, M-1 rifle and submachinegun. When equipped

Figure 1. The M-14 rifle.

Figure 2. The M-15 rifle.

with the heavier barrel and bipod, it is called the M-15. The M-15 (Figure 2) weighs 13 pounds and replaces the 20-pound BAR.

Known during their development as the T-44 and T-44HB these weapons were subjected to exhaustive tests under all conditions of use in arctic, tropic and temperate zones. Their performance was superior to that of the M-1 and other weapons. Some of the factors favoring their adoption are their weight, balance and suitability for mass production. The M-14 is approximately one pound lighter than the M-1; the M-15 seven pounds lighter than the BAR. The excellent balance of the M-14, causes its carrying load to resemble the carbine. Both versions of the rifle fire the 7.62 new NATO standard cartridge and are capable of full automatic or semiautomatic fire.

Currently, it is believed that the rifle will be issued as a semiautomatic weapon but a small selector lever which can be attached to the receiver will make it fully automatic. The selector lever probably will be furnished and maintained with company supply.

The cyclic rate of the new rifle is 750 rounds per minute. The sustained rate of fire is 40-60 RPM for the heavy barrel and 15 RPM for the light. It will fire ball, armor piercing and tracer ammunition.

A new flash hider and system for loading have been developed. The flash hider is effective for single shot at ranges over 50 yards and for automatic fire at ranges exceeding 75 yards. Loading may now be accomplished with a 20-round magazine and then, if desired, by a 10-round charger. The charger is used when ten or less rounds remain in the magazine and the firer wishes to reload without changing magazines. This is accomplished by inserting the charger from the top in a manner much resembling the loading of the M-1 with the conventional clip.

The current plan is to issue nine M-14s and two M-15s to the new 11-man rifle squads. It is not expected that these rifles will be available for issue to troop units until about 1960.

This article was prepared through the combined efforts of Capts Ernest S. Ferguson and Donald S. Ballard and Lt John P. Casey of the Weapons Department, USAIS, and of Mr. Horace Rundell, Training Literature Editing Section, Editorial and Pictorial Office, USAIS.

M-60 Machinegun

You have probably heard rumors that the Army was in the process of developing a so-called "general purpose machinegun." The rumors were right; the machinegun is here (Figures 3 and 4). It is called the M-60 and it has been adopted as standard by Department of the Army.

The M-60 fires the 7.62mm NATO cartridge, which appears to have a ballistic efficiency and killing power within usable ranges that equal the M-2 ammunation used with the heavy and light Brownings. It fires 100 rounds per minute for sustained fire and 200 rounds per minute for rapid fire. Its cyclic rate is 600 rounds per minute.

This new machinegun is expected to replace the .30-caliber Brownings that are currently used on ground mounts: the heavy, water-cooled M-1917A1 on the M-74 tripod and the light M-1919A6 on the bipod and on the M-2 tripod. Pending arrival of the new guns, the M-1919A6 will be retained in the rifle companies and the A4s and A6s in the headquarters company of the battle group.

The M-60 is a lightweight gun. It weighs about 30% less than the Browning machinegun when mounted for comparable tactical employment. Here is a comparison of weights:

M-1917A1 heavy machinegun on the M-74 tripod	71 pounds
M-60 on the M-91 tripod (comparable to the M-74 in stability and performance)	48 pounds
M-1919A6 on M-2 tripod	49 pounds
M-1919A6 on bipod	33 pounds
M-60 on bipod	23 pounds

The M-60 design is simple. The gun is made largely of stamped parts, which facilitates mass production. Some parts are coated with hard rubber to make it more comfortable to handle in extremes of heat and cold. It is relatively easy to disassemble without special wrenches and

Figure 3. The M-60 machinegun on the M-91 tripod.

Figure 4. The M-60 machinegun on bipod.

without any great risk of injury to the operator. Field stripping requires the disassembly of comparatively few parts and headspace does not have to be adjusted. These qualities simplify and speed up training as well as combat maintenance.

The barrel of the M-60 is lined with highly wear-resistant stellite. It has a permanently fixed flash reducer which destroys the characteristic machinegun trademark during night firing. The bipod is attached to the barrel as an integral part. The entire barrel-bipod assembly weighs eight pounds. It can be replaced in six to 10 seconds.

The bipod swings easily into the down position and its adjustable legs "remember" settings with their plunger-type leg and foot locks.

The M-91 tripod used with the M-60 is similar to the heavier M-74 mount. It is made of aluminum alloy and has a recoil mechanism. It weighs only 25 pounds. It permits all-around traverse and free elevation varying from 300 to 600 mils above zero, depending on the position of the gun in relation to the rear legs of the tripod.

The gun fires from "open bolt"; that is, when the trigger is pressed, the bolt and operating rod move forward and the bolt strips a cartridge from the belt. The round is chambered, the bolt is locked and the gun is fired almost simultaneously, and the bolt immediately extracts and ejects the cartridge case. This action practically eliminates cook-offs.

The M-13 disintegrating, split-link, metallic belt is used with this weapon. In addition, a magazine-mounting bracket has been developed that can be fixed to the left side of the receiver to accommodate a 100-round metal or fabric magazine. This innovation is expected to be particularly valuable in the employment of the machineguns of the rifle platoons in close support of the final phases of an attack, since it obviates the need for an assistant gunner while the gunner is delivering marching fire.

The M-60 was service-tested at the

Arctic Test Branch and at Fort Benning by the United States Continental Army Command. It performed with a high degree of reliability in both extreme and average climates, comparing favorably with the heavy Browning in all-around performance. The gun is slated for troop testing this year by one airborne battle group of the 101st Airborne Division. As soon as the results of the troop test have been evaluated and precise modification needs have been determined, the gun will go into quantity production. It is expected that this gun will be issued to units starting in 1958 and that it will take about five years to equip all units.

The killing power of the M-60 machinegun makes it an ideal weapon to assume the direct fire, close support role of the heavy and light Brownings in defense and offense, while its light weight and versatility give it a plus value because it can accompany attacking rifle companies all the way to the objective.

105mm Mortar

A new 105mm mortar (T-33E5) is being developed. It is being considered as a replacement for the 4.2-inch weapon which has been giving indirect fire support to the Infantry since 1943 and which has been an integral Infantry weapon since 1946. The 4.2 or 105 will constitute the organic artillery of the Infantry and airborne battle groups. According to present plans, each of the new Infantry fighting groups should have a battery of eight 4.2s or 105s.

The 105mm mortar (Figure 5) is 200 pounds lighter than the 4.2 (456 pounds to 661), and it breaks down into three loads instead of five as the 4.2. These characteristics make it more mobile for both ground and airborne operations.

The 105 has a smooth-bore barrel, like the lighter Infantry mortars. It is 65 inches long—five inches longer than the 4.2. It has three position seatings located on the barrel to make elevating easier. The smooth bore has reduced the cost and increased the life of the tube.

The 105 has a bipod and baseplate but no separate bridge, rotator and standard like the 4.2-inch mortar.

The bipod has telescoping, adjustable legs that allow the mount to be leveled on uneven ground and facilitate firing at extreme elevations. It can be broken down into two loads for hand-carry. The bipod mount contains the elevation, traversing (including the cross-leveling knob) and shock-absorber mechanisms. The cross-leveling knob is on the left side of the mortar, next to the M-34A2 sight unit. It is manipulated by the gunner.

The one-piece steel baseplate is bowl-shaped. Its underside is heavily ribbed and has spades of such length that the baseplate will rest evenly on the ground without special seating. With the 4.2-inch mortar, the bridge must be supported by sandbags or its baseplate must be emplaced before firing. The 105 has a base-firing mechanism similar to the trigger mechanism on the 60mm mortar.

Both mortars can shift 6400 mils, but

Figure 5. The 105mm mortar.

the 105's barrel-bipod-baseplate combination proves far more successful because, with the 4.2, the crew must dig out around the bridge after prolonged firing to maintain the 6400-mil shift capability.

The new mortar currently is undergoing service tests to determine its suitability as a replacement for the 4.2-inch mortar.

Figure 6. The Dart.

The Dart

The initial draft TOE for the battle group called for the assault gun platoon to be equipped with four 106mm rifles.[4] These were to be used until the M-56, a 90mm self-propelled gun, popularly called the "Spat," became available. Still later the unit was to get the "Dart," an extremely effective guided missile. However, a recent change by Department of the Army removes the M-56 as a contemplated weapon for the assault gun platoon and replaces the 106mm rifles with four M-48 tanks until the Dart becomes available.

Most Infantrymen are familiar with the M-48 tank. The Dart, however, is new (Figure 6). It is a highly effective missile, powered by a rocket motor which uses a smokeless propellant. During demonstrations it has scored bull's eyes on moving targets at extreme ranges. It is designed to destroy the heaviest tank known today and also may be used against any heavily reinforced concrete fortification. The Dart may be fired and guided from the ground or from a vehicle.

Most of the performance characteristics of the Dart are currently classified.[5]

[4]See "Why Five?", April 1957, *Infantry*.
[5]When additional information is available for publication, *Infantry* will discuss this weapon in more detail.

The imposing array of responsibilities which rest upon our Army today is matched by its impressive accomplishments in the development and employment of new weapons, modern equipment, streamlined organization, and atomic battlefield tactics. The Army is fully abreast of the rapid evolution of modern warfare. It has promptly seized upon each advance of technology to insure that it will be fully able to accomplish its mission no matter what kind of war might be thrust upon us.

SECRETARY OF THE ARMY WILBER M. BRUCKER

In respect to firepower, the Army now has more than five different weapons capable of delivering atomic weapons with ranges from a few thousand yards to scores of miles. Through the use of guided missiles, we now have a firepower range that is 14 times greater than that of World War II.

GENERAL MAXWELL D. TAYLOR

ROCID

Mobility

PENTOMIC INFANTRY DIVISION

GROUND MOBILITY *By Capts Vernie G. Tosh & James B. Hobson*

WE now turn to another factor in the "Pentomic equation."[1] This factor, without which the equation means nothing, is mobility. The new division is highly mobile. It has to be. Atomic weapons demand that units move quickly on the battlefield. If they don't, they face destruction.

The pentomic Infantry division has better air and ground mobility than its triangular predecessor. This article will discuss some of the means which have increased the division's ability to travel on the ground.

Division

Two important factors give the division more ground mobility. It has more

[1]Mobility + firepower + communication = superior force at the point of decision.

vehicles, *in relation to personnel strength,* than the triangular division. And its vehicles are pooled (mainly at division level but also at battle group level) for centralized control.

Although the new division has 22% fewer personnel than the triangular division, it has only 17% fewer vehicles. The number of armored carriers has been considerably increased.

MOBILITY CAPABILITIES OF THE PENTOMIC INFANTRY DIVISION

Battle group	37%
Hq & Hq Co	75%
Rifle Company	10%
Mortar Battery	100%[3]
Division artillery[4]	100%
Division Hq & Hq Co	100%
Ordnance battalion	80%
Quartermaster company	100%
Aviation company	100%[5]
Signal battalion	66%
Hq & Hq Co	30%
Command Operations Co.	80%
Forward Communications Co.	90%
Armor battalion	100%
Cavalry Squadron	100%
Transportation Bn	87%
Hq & Hq Co	50%
Truck Transport Co	100%
Armored Carrier Co	100%
Engineer battalion	100%
Hq & Hq Det & band	10%
Medical battalion	45%
Hq & Hq Det	25%
Ambulance Co	100%
Clearing Co	10%
Administration company	10%

Figure 1. Mobility of the pentonic Infantry division using organic transportation.

Centralized control of vehicles increases the division's efficiency by permitting use of a maximum number of vehicles at all times, by providing maximum utilization of shop facilities and specialized personnel and, finally, by eliminating duplication and overhead at all levels of command.

Perhaps the best example of this centralization is found in the battle group. Compared to the regiment it replaces, the battle group has 66% fewer vehicles and 74% fewer motor maintenance personnel. It has one maintenance unit (the supply and maintenance platoon of battle group headquarters and headquarters company) while the regiment had 11 maintenance units (sections in the medical company, headquarters and headquarters company, service company, tank company, three battalion headquarters and headquarters companies, and three heavy weapons companies).[2] The supply and maintenance platoon performs organizational maintenance on all battle group tracked and wheeled vehicles.

Centralized control and additional vehicles enable many of the division's units to ride to work. Many units, as shown in Figure 1, have 100% mobility. Others, especially the rifle companies, can be completely mobilized by the attachment of APCs or trucks from the division transportation battalion. By using all of the transportation battalion's organic 2½-ton trucks (80) and armored personnel carriers (114) two battle groups can be made 100% mobile. The armored carriers will lift one battle group.

The transportation battalion, a newcomer to the Infantry division, furnishes the division commander with a ready pool of transportation over which he has di-

[2]The battle group's mortar battery, however, still maintains its own vehicles, as did the regimental heavy mortar company.
[3]Depends on Headquarters and Headquarters Company for ammunition resupply and transport of mess.
[4]Tactically self-sufficient but requires additional administrative transport for 100% mobility.
[5]100% mobile with use of aircraft.

M-59 armored personnel carrier.

rect control. The battalion is composed of a transportation truck transport company and two armored carrier companies.

The truck transport company of the transportation battalion has 80 trucks in four truck platoons of two squads each. Each squad has 10 2½-ton cargo trucks with trailers. The truck company can lift, at one time, 1200 personnel or 240 short tons of cargo or any appropriate combination. This capability is based on a 75% availability of trucks. A large percentage of these trucks probably will be in use at all times. Except when they are back in the transportation battalion area for maintenance, these trucks will not be idle as are trucks of current organizations when the units are in a relatively inactive status, such as in reserve.

Each of the two armored carrier companies can transport, at one time, 60 tons of cargo or 440 personnel, also based on a 75% availability. Unlike the trucks, the APCs will occasionally be a waiting pool of transportation. The carriers give the Infantry division an added mobile river-crossing capability and a limited Armored-Infantry capability. This is a significant addition to the flexibility of the division.

Both the truck transport company and the two armored carrier companies depend on the battalion headquarters and headquarters company for maintenance. This is another example of centralized maintenance control. The headquarters and headquarters company has the additional capability of attaching maintenance sections to the operating companies when they are supporting assault units.

Battle group

What does the consolidation of vehicles and maintenance support at division level mean to the battle group?

Consolidation and centralization of

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CAPT JAMES B. HOBSON was graduated from the United States Military Academy in 1946 and completed the basic airborne course the next year. He then served as a platoon leader and company commander with the 34th Infantry Regiment in Japan and with the 511th Airborne Infantry Regiment at Fort Campbell. After a three-year tour in the G2 Section, Office of Chief of Staff, United States Army, Europe, he was graduated from the advanced class at the United States Army Infantry School in 1956. He then began his present assignment with the Training Literature Editing Section, Editorial and Pictorial Office, United States Army Infantry School.

vehicles and motor personnel and facilities help give the battle group commander a proportionately larger foxhole population than that of the old regiment. The reduction of vehicles in the battle group (124 to the regiment's 371) lessens, somewhat, the battle group commander's general automotive responsibilities. Specifically, it decreases his responsibility for the maintenance of vehicles which he does not need at all times. He no longer must supply all of his gasoline needs with his organic vehicles. The gasoline is now delivered to the battle group by tank trucks organic to the division quartermaster company.

The battle group motor officer is a member of the battle group commander's staff.

Although the battle group requires considerable supporting transportation for all types of operations, it does have a limited amount of organic transport. Besides the combat and command vehicles throughout the battle group, the supply and maintenance platoon of the headquarters and headquarters company has a truck squad and an ammunition squad.

The truck squad has five 2½-ton trucks and five 1½-ton cargo trailers for transporting company mess equipment and personnel, company individual rolls and supply room paraphernalia, and reserve rations. In other words, each truck does the job of two trucks in the triangular organization.

The ammunition squad is equipped with four 5-ton trucks, six 2½-ton trucks, six water trailers, two 1½-ton cargo trailers, and two 2-ton ammunition trailers. The squad can normally lift 42 tons of cargo.

The rest of the headquarters and headquarters company is about 85% mobile, with the reconnaissance, assault gun, communications and engineer platoons being 100% mobile.

Mortar battery

The heavy mortar battery is considered to be 100% mobile except that it depends on the battle group headquarters and headquarters company for ammunition resupply and for a mess truck, trailer and water tank. The ammunition appetite of the heavy mortar makes this an important exception, however. The battery has one 2½-ton truck for battery maintenance, compared with the four 2½-ton trucks of the Infantry heavy mortar company which it replaces.

Rifle Company

Compared with the current rifle company the pentomic rifle company has lost its one 2½-ton truck and has gained four ¾-ton trucks. The company now has four ¼-ton trucks and the four ¾s. Most of these vehicles are organic to the weapons platoon: all of the ¾s and three of the jeeps. The only vehicle in company headquarters is a jeep.

Here is what these changes will mean to the company commander:

The ¼-ton truck in the headquarters carries the company's principal radio set, the AN/VRC 18. Thus, it cannot be used as a utility vehicle as is the second ¼-ton truck in the current company headquarters. This second vehicle has been available to the supply sergeant, mess sergeant, armorer artificer and communications sergeant for the hauling of supplies, rations, ammunition, wire, batteries and other supplies necessary to support the company in combat. The loss of the 2½-ton truck in the company makes the company dependent on battle group for transporting individual rolls and supply room items such as chemical detector kits, demolition sets, armorers tools, wire cutters, panel sets and radiac equipment which are not used every day.

The weapons platoon is now 100% mobile with a gain of one ¼-ton truck (making a total of three) and four ¾-ton trucks. One ¼-ton truck is a reconnaissance vehicle in the platoon headquarters. The other two carry the two 106mm rifles. One ¾-ton truck in platoon headquarters transports forward observers, computer personnel, radio telephone operators and their equipment, and ammunition when possible. The remaining ¾-ton trucks carry the 81mm mortars.

Even though there are fewer vehicles in the pentomic Infantry division than in the triangular division it is readily apparent that mobility has been gained. Trucks are assigned, by type, where they can give greater support to the fighting soldier. The "loss" of trucks which sat around in the old organization with poor utilization will help, not hamper, our operations. We can do more with less because our vehicles are more functional.

Air Mobility

By Maj Lawrence L. Mowery and Capt James B. Hobson

Today, more than ever before, the Army—from the highest command down to the squad—must be air mobility conscious. The development of tactical atomic weapons has increased our requirements for speed, flexibility and dispersion.

These powerful weapons demand that we be able to bring tactical units together at the critical time and place. When an objective has been taken and the need for concentration has passed, we must have the means to disperse these forces rapidly to avoid presenting a remunerative atomic target to the enemy.

The ability to move forces by air,

along with increased ground mobility, will permit commanders at all echelons to concentrate or disperse forces more rapidly. It will permit greater flexibility in combat operations. For example, with air mobility, the commander can quickly shift reserves to a threatened area or blocking position. He can exploit success, reposition forces to parry enemy actions, overcome natural and artificial obstacles, or withdraw his forces vertically from untenable positions.

Among the criteria[1] established for a new Infantry division for the atomic-age battlefield was a requirement for increased air transportability. When these criteria were translated into organizational plans, the need for improved air transportability was considered. However, this requirement had to be weighed against the primary characteristic of any Infantry division—the capability of sustained ground combat.

Sustained combat is not compatible with complete air transportability. It demands heavier items of equipment such as tanks, armored personnel carriers, artillery and rockets which are not air transportable in current troop carrier aircraft or which would require too much airlift to be feasible in normal operations. Consequently, while a higher degree of transportability has been achieved in the pentomic Infantry division, complete air transportability is found only in the pentomic airborne division.

In discussing air mobility, we should consider the Infantry division's specific capabilities for air movement and other capabilities provided by its own organic aircraft. There are many ways in which the division's aircraft can be utilized to increase mobility and to give the commander greater flexibility. Aerial reconnaissance, airborne or airtransported patrols, raids, target acquisition, shifting of reserves, repositioning of forces, vertical withdrawals, aerial supply or resupply are but some of the many capabilities of the aircraft available to the division commander.

Air transportability

The new organization has improved air transportability without materially decreasing its sustained combat capability. The major portion of the division *can* be airlifted in a strategic air movement. This type of move normally will require the use of heavy troop carrier transports of the Air Force (C-124 and C-133).

[1]See "Why Five?" April 1957 *Infantry*.

The L-19, "Bird Dog". This and the other aircraft shown are those currently found in the new aviation company.

L-20, "Beaver"

It will be used primarily to transport the air-lifted echelon of the division from the zone of interior to an overseas theater or from one theater to another. Tanks, armored personnel carriers, heavy engineer equipment etc., either cannot be airlifted or will require too many aircraft to be practical.

The division also has the capability of participating in joint tactical airborne operations. Such operations will contain specialized airborne elements and Air Force elements including assault and medium troop carrier aircraft (C-123 and C-130). Some of the heavier division vehicles and weapons cannot be transported. However, the five major combat elements of the division, the battle group, are light and, except for two light tanks and two armored personnel carriers in the group's reconnaissance platoon and the four tanks in the assault gun platoon are completely air transportable by medium transport aircraft.

Many elements of the division—from squad to reinforced battle group size—can be transported for small-scale tactical operations in Army aviation available to the division and higher commanders.

Let's take a look at some of the specific air transportability capabilities of the combat elements of the division. While the numbers and types of aircraft required to lift the pentomic Infantry division and its subordinate elements are currently being studied and requirements have not yet been finalized by Department of the Army, the United States Army Infantry School has developed tentative capabilities. These capabilities were determined by using the airborne planning figure of 240 pounds (weight of the average combat loaded soldier) for all personnel, by making basic load calculations from information in "Reference Data, Infantry Division Battle Group," March 1957 and by computing other weight and size data from information in appropriate technical manuals.

The battle group can be airlifted in a single lift in 92 C-119 aircraft with only the following equipment and personnel left behind:

Personnel	47
Carrier, personnel, full tracked, armored	2
Tank, 76mm gun	2
Tank, 90mm gun, M-48	4
Truck, cargo, 5-ton, 6x6, LWB	2
Truck, cargo, 5-ton, 6x6, LWB WW	2
Truck, light wrecker, 2½-ton, 6x6, WW	1
Truck, Shop van, 2½-ton, 6x6	1
Trailer, 1½-ton, 2W, water tank	3
Trailer, 1½-ton, 2W	1

The same capability exists when the C-123 aircraft is used. This is based on

H-19

a 16,000 pound allowable cargo load for both aircraft. It should be pointed out that the airlift requirements depend on the figures used for allowable cargo load since the allowable load varies depending on the mission, range or radius of action, condition of the aircraft, weather, and other factors.

A new aircraft in our arsenal is the C-130 "Hercules," the replacement for the C-119. This aircraft has a 25,000-pound allowable cargo load as compared to 16,000 pounds for the C-119 and C-123. As a result, the battle group can be airlifted in 71 C-130s, leaving behind only 39 personnel, two armored personnel carriers, four 90mm gun tanks and two 76mm gun tanks.

When we compare these capabilities with those of the regiment in the current division the improvement in air transportability becomes apparent. In a joint airborne operation the regiment to be air landed normally is divided into an initial echelon, a follow-up echelon and a rear echelon. To airlift the regiment 100 C-119 aircraft are required for the initial echelon and 141 C-119s for the follow-up echelon. Movement of the rear echelon requires heavy transport aircraft, and therefore, it is not considered as air transportable in making this comparison. Remaining in the rear echelon are 176 personnel, 11 trucks, 5 trailers, 22 90mm gun tanks, 1 armored vehicle and 2 tank recovery vehicles. Even when the difference in the size of the two units is taken into account the battle group has greater air transportability than the regiment.

Airlift requirements using the H-34 helicopter to transport the battle group are based on an allowable cargo load of 3,400 pounds and a radius of action of 50 nautical miles. The total number of H-34's required to airlift the battle group is 203. The number of personnel and types and quantities of equipment that cannot, or would not, be airlifted are listed below:

Personnel	106
Carrier, personnel, full-tracted, armored	2
Trailer, ammo, 2-ton, 2W	2
Trailer, ¾-ton, 2W	41
Trailer, 1½-ton, 2W	11
Trailer, 1½-ton, 2W, water tank	6
Truck, cargo, 5-ton, 6x6, LWB	4
Truck, cargo, 5-ton, 6x6, LWB WW	2
Truck, cargo, 2½-ton, 6x6, LWB	5
Truck, cargo, 2½-ton, 6x6, LWB, WW	10
Truck, cargo, ¾-ton, 4x4	44
Truck, light wrecker, 2½-ton 6x6, WW	1
Truck, shop van, 2½-ton, 6x6	1
Tank, 76mm gun	2
Tank, 90mm gun, M-48	4

All radio sets mounted in vehicles larger than ¼-ton truck.

When the H-37 helicopter is used to transport the battle group airlift requirements are based on an allowable cargo load of 6,000 pounds and a radius of action of 76 nautical miles. The total number of H-37s required to airlift the battle group is 188. The number of

personnel and types and quantities of equipment that cannot, or would not, be airlifted are listed below:

Personnel	44[2]
Tank, 76mm gun	2
Tank, 90mm gun, M-48	4
Carrier, personnel, full-tracked, armored	2
Trailer, ammunition, 2-ton, 2W	2
Trailer, water tank, 1½-ton	6
Truck, cargo, 5-ton, 6x6, LWB	2
Truck, cargo, 5-ton, 6x6, LWB, WW	2
Truck, cargo, 2½-ton, 6x6, LWB	4
Truck, cargo, 2½-ton, 6x6, LWB, WW	10
Truck, light wrecker, 2½-ton, 6x6, LWB WW	1
Truck, shop van, 2½-ton, 6x6	1

The number of H-34s and H-37s required to transport the battle group in a single lift obviously is quite large. However, all of the air transportable equipment or vehicles may not be needed in the operation. Also, it will be normal in such operations to lift the battle group in two or more lifts. These factors will reduce the number of aircraft required.

Organic aircraft

The pentomic division has gained additional mobility and flexibility through an increase in organic aviation. There are 50 fixed and rotary wing aircraft in the new organization as compared with 26 in the current division. Equally important is the pooling of these planes in a new aviation company. Decentralization of aircraft and personnel to operate them in the triangular division has presented problems and resulted in reduced effectiveness in the past. Many division commanders have found it necessary to organize a provisional aviation company to obtain increased utilization and more efficient maintenance for these expensive, difficult to maintain and hard to replace items. Centralized control should be a definite improvement. It should be noted also, that some of the aircraft in the new division have greater performance capabilities than those in the current division.

The new aviation company has three major subordinate elements: a direct support platoon, a general support platoon and a service platoon.

The *direct support platoon* is broken down into a platoon headquarters, an artillery flight, a target acquisition section, and five combat support flights. The artillery flight has ten L-19 aircraft and provides aircraft on a required basis to the artillery elements of the division for spotting targets and adjusting artillery and mortar fires. The target acquisition section has three L-19 and three L-20 aircraft. These aircraft team up with the reconnaissance and surveillance platoon of the cavalry squadron for aerial visual reconnaissance and provide platforms for aerial TV, infrared and radar devices. This gives the division a tremendously increased capability for the acquisition of targets — a particularly essential requirement on the atomic battlefield. Each of the combat support flights has one H-13 reconnaissance helicopter. This aircraft and the pilot (flight commander) are attached to a battle

H-13

[2]The 106mm rifle, mounted on ¼-ton truck, is substituted for tank, 90mm gun, M-48.

H-23

group on an as-needed basis. The flight commander in actual practice becomes the aviation adviser to the battle group commander upon attachment of the flight group to the battle group.

The *general support platoon,* within its capabilities and as required, provides reinforcement for the direct support platoon. The platoon normally operates from a divisional base airstrip. It is broken down into a command support section, tactical support section and a utility section. The *command support section* has three L-20 utility aircraft and three L-19 observation aircraft. These planes normally will be used by the division commander and his staff officers for reconnaissance and liaison. The *tactical support section* has fifteen H-13 reconnaissance helicopters and it is from this section that aircraft are provided on a required basis to reinforce the combat support flights or to support other units of the division. The *utility section* is the work horse of the division. It is from this section that the capability for aerial lift of troops and supplies is provided. Specifically, this section, based on average conditions, can lift 48 fully equipped troops or about 6 tons of supplies in a single lift.

The *service platoon* maintains all aircraft organic to the division and operates basic airfield facilities. Its maintenance section is composed of one warrant officer and 28 enlisted men, most of whom are airplane mechanics, helicopter mechanics, and hydraulic or electrical repairmen. The small (five men) airfield service section is responsible for petroleum storage, crash rescue and runway lighting.

An analysis of the Infantry division aviation company reveals areas in which the pentomic infantry division achieves increased capabilities for air mobility, reconnaissance, surveillance, target acquisition and other functions. However, in spite of the greater number of aircraft in this division its organic air mobility is still at a minimum. Corps and Army must be relied upon to extend these capabilities by furnishing additional army aircraft, particularly for operations which require the movement of troops by air.

This "package" of articles on the pentomic Infantry division will be continued. The material to be covered in the next issue will be: tactics for the defense, communications, logistics, medical support, staff procedures, etc.

BATTLE DRILL

Instruction in combat formations and battle drill, covered in considerable detail in article, "Battle Drill," January 1957 issue of *Infantry* is now being implemented in Infantry units. Several weeks after its appearance in *Infantry* information on this subject was published in Training Circular 7-10-2, "Combat Formations and Battle Drill," 14 January 1957, and later as an appendix in Training Text 7-10, "Rifle Company, Infantry Regiment." It will also be published for pentomic units as an appendix in FM 7-10, "Rifle Company, Infantry Division Battle Group," which is now being revised and should be published by the end of this year.

DECISION

Decision on the atomic battlefield will be most difficult.

Commanders must react immediately and with skill.

By Capt Robert T. Fallon

A figure moves quickly through the darkness, stumbles at the entrance to a small CP bunker and enters, apparently in some haste.

"Colonel!"

"Yes?"

"Sir, it's Foster."

"Oh. Hello Chuck. What is it?"

"The enemy has moved out from in front of A company, sir."

"They've moved out? How long ago? What time is it?" The colonel is suddenly alive. He moves quickly from a cot in the corner as he listens intently to his young S3 standing in the dark before him.

"Sir, everything has been pretty quiet since midnight. There was normal activity with our contact patrols and a little scattered firing, but nothing unusual. Then around 0300 one of A company's patrols got about 400 yards forward of their position without finding anything. They reported back immediately and I came to get you as soon as I heard from Captain Phillips."

"How about the other companies?"

"I've had no reports, sir. Sergeant James was calling them when I left."

"OK. Let's go."

The two men emerge into the night

and follow the ghostlike line of engineer tape which leads to the operations bunker. In their movements, voices, and obvious haste, they reflect the tension which this single report has created.

This is an atomic war. This is a battle group, part of a defensive line situated in the midst of a land desolated by the atomic weapon. This battle group is organized on a position which has withstood, for more than 24 hours, the strong attacks of a determined enemy. The enemy has now stopped his attacks. What will he do now, faced with the failure of his assaults? The pattern was set early in the war. He can continue his pressure on the ground or withdraw.

If he withdraws he may do so for two reasons. He may attempt to blast his way through with an atomic weapon or endeavor to draw the battle group into a salient and cut it off.

Threat of the atomic weapon hangs like a cloud over the battle group. It permeates the night air and reveals itself in a hundred different ways—the nervous movement of sleepless troops; quick, tense telephone conversations between units; drawn faces of staff officers who stand gazing intently at the maps before them. These men know that their lives hang on the skill and the speed with which their commander can react to the situation that appears to be developing there in the night. They all know that they must "hug" the enemy for their own protection if he withdraws to use his terrible weapon. On the other hand they must not get "sucked in." Above all they must keep contact with him.

This anxiety is apparent in the face of the commander as he enters the operations room. His first questions are short and terse.

"Any word from the companies, sergeant?"

"Yes sir. There's been no change in enemy dispositions except that reported earlier in the evening by A company."

"What's A company doing now?"

"They've had several patrols to their front trying to locate the enemy. Captain Phillips has been trying to reach you sir."

"Get him on the phone. Chuck, I want 100% alert. Step up the patrolling. I want to get some people into the enemy rear areas. Find out if there's anything in back of them. If this is only a screen they're leaving in front of us they may be getting ready to drop one. Meanwhile, I want everyone else in his hole, minimum movement in the area, everyone under cover. I mean *everyone!* Johnson, call division and find out if they're pulling out anywhere else along the front."

With this activity the tenseness relaxes somewhat. The commander has given his orders. His men can busy themselves now, forgetting their fears. They know what to do. They've done it before successfully and they work now with the growing confidence that they will succeed again.

"Sir, I have A company."

"Thanks. Hello, Phillips? What's going on out there?"

"Nothing new, colonel. It looks like they've really gone. I've had two patrols out as far as 500 yards and there's just nothing in front of me."

"OK, Phillips. Here's our situation. We don't know yet if there have been withdrawals anywhere else. We're checking with division right now. I want you to move out about 300 or 400 yards but don't lose contact with B and C companies on your flanks. They may be trying to suck us out the way they did D company the other night. I don't want you more than 400 yards forward of your present positions. Any questions?"

"Sir, I'd like to patrol out beyond that 400 yards and see if I can find them."

"Of course, but only in your own sector. B and C companies are patrolling to their fronts and I don't want you getting

mixed up with them in the dark. Now go to it. Keep me informed."

"Right, sir."

By this time the battle group is awake. Orders are passed on. There is the quiet movement of bodies through the night and the occasional sound of a shovel chipping away at the rocky soil. These are comforting indications of activity. The group is preparing. The men know little at the moment except that they must remain under cover. Some of them, those who have seen the fiery ball erupt before, are less anxious, knowing that one can live through such a thing. The others, the newer ones, display a mixture of bravado and naked fear. All know that something must happen soon, though not sure at what instant it will come. To these, the ones who can do nothing but burrow into their holes and wait, this war is the most terrible. But in this the war is no different from any other. It is the busy ones who are fortunate.

"Sir, I have a report from B company. They say that there's no change to their front. They managed to get a patrol through far enough to find a company CP still intact, and they could see no indications of any movement to the rear."

"I can't make it out, Chuck. What the hell are they up to?"

"I don't know, sir."

"If we try to push them back now it may be just what they're waiting for. They may be sitting back there with enough stuff to smack us good and even cut us off. But if they are really pulling back, we've got to move out and follow them up before they bust one over us."

"Colonel, here's a message from C company. They're having trouble getting a patrol through the enemy lines. They all seem to be wide awake over there."

"Wide awake eh? How long till daylight?"

"About an hour, sir."

"Chuck, get hold of C company. Tell Martin that he's got to get through. We must know if there's anything behind those people and we won't be able to see a thing for at least another hour. Tell D company to stay where they are and remain under cover. Now, where's Johnson?"

"Here, sir."

"Joe, do you have anything from division about enemy movements?"

"Not much, sir. There doesn't seem to have been anything out of the ordinary along our front. They're still moving people up. There doesn't seem to be any slackening. If you have a few minutes, I can give you some of the exact dispositions as we . . . ."

"Excuse me, sir, B company on the

CAPT ROBERT T. FALLON graduated from the United States Military Academy in May 1949. During the following two years, he attended the Ground General School at Fort Riley, Kansas, and the Infantry Officers Basic Course at The Infantry School, Fort Benning, Ga. He then served as a company officer with the 17th Infantry Regiment, 7th Division, in Japan and Korea, following which he returned to Fort Benning to attend the Airborne School. After a two year tour of duty with the 82d Airborne Division at Fort Bragg, N. C., he went to Germany where he served with the 43d and 5th Infantry Divisions until May 1955 when he was appointed an instructor at the 7th Army's NCO Academy in Germany. Returning to the states he attended the Advanced Class at The Infantry School. He graduated from the course in April of this year and was assigned his present position as Assistant Professor of Military Science and Tactics at Canisius College, Buffalo, N. Y.

phone. Captain Carter wants to speak to you."

"Thank you, sergeant. Colonel James here."

"Sir, they've gone!"

"What the . . ."

"I don't know when it happened exactly. About 10 minutes ago one of my patrols reported that they couldn't find anyone to their front. I went out to see for myself and that's it. They just seem to have slipped off into the . . ."

"Get after 'em, Carter. Move out immediately. The group will secure positions as far as phase line Bravo. Tie in your flanks and then patrol to your front up to 400 yards. See if you can find . . . what's that?"

A sudden burst of air rushes through the vent holes of the bunker and a violent tremor shakes the ground beneath. Outside a ball of fire rises above the distant horizon and momentarily gives the night a light brighter than any day.

"Sir, they've just busted one to the north. It's over the 4th group somewhere. I don't know . . ."

Another flash followed by a roar from the south drowns out any further words.

"My God! Carter! Carter, can you hear me? Keep your people down in their holes! All of them! Foster! Get in touch with the other companies and tell them to get set. I want every man in this CP under cover! We're staying. If it's going to come it'll be in the next few . . ."

The early morning sky erupts into a holacaust of flame and blast which descends with its wild fury upon the small ridge where the battle group lies huddled in its holes. Many of these men will live to see the dawning of the day. Some won't. Those who survive and later come down off that hill are a different breed of men from those who climbed it. They have, for an instant, seen the face of Hell. Such a sight does not soon leave the eyes of men.

SELL OUT

The April issue of Infantry, *with a basic article on the pentomic Infantry division, was a complete sellout. Several thousand additional copies of the July issue have been printed but it is probable that demand may again exceed our supply. There may be others in your unit who would benefit from the official information on pentomic Infantry organizations, tactics, weapons and techniques to be found in this and future issues. Will you please bring* Infantry *to their attention and ask that they enter a subscription as soon as possible? The Book Department will fill all subscriptions on a "first come, first serve" basis so long as the supply lasts. Subscriptions received after copies of the current issue have been exhausted will necessarily begin with the next issue.*

United States Army Infantry School

The United States Army Infantry School celebrated its golden anniversary on 1 April. Since its founding 50 years ago the school has developed and trained Infantry leaders. Victories on the battlefields of three wars attest to its success.

Today's Infantry School, the foremost of its kind in the world, grew from the School of Musketry organized in 1907 at the Presidio of Monterey, California. A secondary function was quickly added to its primary job of training Infantry leaders. It became—and still is—a testing and research organization. Some of its first experiments dealt with the tactical employment of the machinegun.

Shortly before America's entry into World War I the War Department reorganized the school, which had moved to Fort Sill, Oklahoma, and expanded its area of responsibility. Toward the end of the war Fort Sill proved inadequate for the increased program; classes were being held at such widely separated locations as Camp Perry, Ohio, and Camp Hancock, Georgia.

To overcome the congestion at Fort Sill and to consolidate the activities of all three "Infantry Schools" the Army decided, late in 1918, to locate the Infantry School near Columbus, Georgia, on the site of an old plantation. The new post was named Camp Benning, after Confederate Brigadier General Henry L. Benning who had lived in Columbus. The school officially opened 22 June 1919. It has grown steadily since.

Tents gave way to frame buildings, which in turn were replaced by concrete and brick structures. Land acquisitions over the years gave Fort Benning its present 184,000 acres of varied terrain needed for Infantry training.

As the post changed so did much of its teaching. Garand's semiautomatic rifle replaced the bolt-action Springfield. Mortars became more powerful and more accurate. Recoilless weapons and antitank rockets were developed. The square division went triangular in time for its winning role in World War II. The airborne Infantryman learned to jump into battle. Guided missiles and free rockets added their firepower to the support of the foot soldier.

The Infantry School played an important part in developing or testing these new concepts in weapons, organization and tactics.

Today the school trains men not only from this country but from some 35 Allied nations as well. It is developing organizations and tactics for a new pentomic (ROCID) division designed to fight and win on the atomic battlefield.

The 1957 graduate of the Infantry School is prepared to face nuclear weapons just as the 1907 alumnus of the Presidio was ready to deal with the machinegun—the mass-destruction weapon of that day. This fact, better than any other, shows how the school has kept abreast of technical developments and helped to shape the Army's thinking as the means of waging war have changed.

The United States Army Infantry School begins its second half century with its training and testing missions just as important as ever. In spite of today's nuclear weapons, it is still the Infantryman, with his rifle, bayonet and mud-caked boots, who must seize and hold the ground. As always, the man with his feet on the ground is still the ultimate weapon.

PARACHUTING fr

G from ARMY AIRCRAFT

By Major
Lawrence L. Mowery

Parachuting from helicopters and other light army aircraft, though it may seem incongruous, is an important new capability for Infantrymen

Parachutists jumping from a helicopter may seem a rather odd sight. With this aircraft's ability to hover and to land almost anywhere, in any kind of terrain, it may seem ridiculous for time and money to be spent on this sort of activity. Yet, jumps are being made from helicopters and from small, fixed-wing aircraft at the U.S. Army Infantry School—and for very good reasons as we shall see.

Current regulations prohibit the use of Army aircraft for troop parachute operations. However, authority has been given for experimentation and testing. Tests with a number of different aircraft have now been conducted and training literature is being prepared on doctrine and techniques for limited parachute operations using helicopters and small, fixed-wing planes. These tests and other developments are expected to lift the restriction.

Why are we interested in parachuting men from Army aircraft, particularly helicopters? The answer is relatively simple; it stems from a specific need. There will be many situations on the modern battlefield in which this capability will be of great value. One such situation is the need to put a small reconnaissance patrol into enemy territory. Of course the patrol could be landed, especially by helicopter, but not with secrecy and not without risk to the aircraft. The noise made by the plane's landing and takeoff would alert the enemy to the patrol's presence and could expose the plane to fatal ground fire. However, in an area where helicopters or light aircraft have been used in normal operations, an airborne patrol can be *dropped* without risk of immediate detection by the enemy. The mission can be accomplished at night and the parachutists can jump from the craft without

Figure 1. Parachuting from the H-21C helicopter.

any visible or audible indication of the operation. The droning sound of these small aircraft in flight will reveal nothing unusual to the listening ear. Since there is no necessity for either decreasing or increasing the sound of the engine, the patrol can drop on its objective without the enemy knowing when, where or even if it were dropped.

There are many other situations where men parachuted from Army aircraft can be employed effectively, such as Army pathfinder operations and operations in restricted areas such as woods and jungles where not even a helicopter can land.

This capability of parachuting men from Army aircraft can also be used for small raids and for other operations when speed is needed and when weather, natural or artificial obstacles or the depth of the enemy's defensive crust prevents the use of normal ground operations. It will provide a flexibility long desired and needed by the commander in many situations. Other valuable uses for this capability will become apparent as the tests and developments continue.

Jumping from light Army aircraft is not just a matter of going up in the air and stepping out. Numerous safety factors and special techniques are required and vary according to the type of plane. For example, the downwash of the helicopter's rotor blades may invert the canopy of the parachute unless the proper technique is used.

Tests are being conducted and doctrine and techniques are being developed for this new capability by the Airborne-Air Mobility Department of the U.S. Army Infantry School. Before any plane is considered for this purpose it is first tested by the U.S. Army Airborne and Electronics Board at Fort Bragg. This board determines the suitability and safety of parachuting from Army aircraft. All

Army aircraft except command and liaison fixed-wing planes and reconnaissance helicopters are being tested. As each new type aircraft is made available to the Army it will be evaluated for a parachute capability and, if appropriate, similar tests will be made.

To date the Airborne-Air Mobility Department has conducted jump tests with the following planes: the L-20 (Beaver), a fixed-wing aircraft, and the H-19D and H-21C helicopters. Training literature on the L-20 has been prepared and published as a change to TM 57-220, "Technical Training of Parachutists." Literature also has been prepared for the H-19D and H-21C helicopters and submitted to Department of the Army through U.S. Continental Army Command for approval and publication. Jumps will be made from the U-1A (Otter), the H-34 helicopter and the H-37 helicopter as soon as the tests conducted at Fort Bragg determine that the planes are suitable and safe for the delivery of parachutists.

Jumping from Army aircraft has been received with enthusiasm by old and new parachutists alike. Although the same general techniques are used by the jumper

MAJ LAWRENCE L. MOWERY began his military career 17 years ago when he enlisted in the California National Guard. He received an OC commission at Fort Benning in December 1942 and later was graduated from the Parachute School. Throughout World War II, he served in Europe with the 505th Parachute Infantry Regiment, 82d Airborne Division. He returned to the United States with that unit and, following a brief tour of duty at Fort Bragg, went to Japan to serve with the 187th Airborne Infantry Regiment and later with the 7th Infantry Division. Returning to this country, Maj Mowery was once again assigned to the 505th at Fort Bragg and then went to Korea to serve with the 279th Infantry Regiment, 45th Infantry Division, and with the 24th Infantry Division. Two years ago he was graduated from the Command and General Staff College, Fort Leavenworth, and returned to Fort Benning as a member of the Doctrine-Requirements Committee, Airborne-Air Mobility Department, United States Army Infantry School.

Figure 2. Trooper immediately after jumping from the L-20 "Beaver."

in leaving the aircraft and in landing, there are several differences. The opening shock of the parachute is normally less when jumping from small aircraft. This is due to the lower forward speed of these planes. While reduced shock pleases the trooper, this type of jump demands that he be more alert. The lower forward speed *increases* the length of time it takes his parachute to fully deploy after he leaves the plane. The four seconds usually required for the chute to open when parachuting from Air Force planes flying at speeds of 100 to 130 knots is increased to five or six seconds when parachuting from the slower Army aircraft. The jumper must allow for this time difference before resorting to use of his reserve chute.

Of the Army aircraft tested to date, all but the H-21C helicopter require the parachutist to exit from the craft from a sitting position. This necessitates some modification in technique and does not appeal to all jumpers.

Although the helicopter can hover without any forward motion, the parachutist cannot jump from the craft at this time. Downwash from the rotor blades could invert his canopy, or push him into the static line or lines of preceding troopers causing serious malfunction of the parachute and possible injury or death. Therefore, it is necessary to prescribe a minimum forward speed for each type of helicopter which will nullify this downwash hazard. Maximum forward speeds must also be established for each helicopter. When rotary wing aircraft reach a certain speed, the body of the parachutist may be whipped into the landing gear or other parts of the craft by the wind blast of the rotor blades.

Figure 3. A modification near the floor of the H-21C provides an anchor line to which the trooper "hooks up."

Figure 4. The anchor line on the H-19D helicopter is installed at knee level.

Since only a small number of troopers can be dropped from Army aircraft, there is no requirement for the large drop zones normally required in joint parachute missions. Small fields can, and normally will, be used as drop zones. These DZs may be

Figure 5. Proper position for exit from the H-21C helicopter.

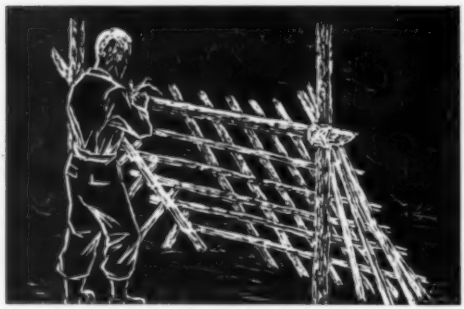
cow pastures, small gardens, small openings in wooded areas or even a village square. The pattern of parachutists on the ground will be small, even with a two-second interval between jumpers. This compact drop pattern greatly increases speed in assembly and the over-all mission on the ground. The troopers can be out of the aircraft, on the drop zone and assembled at a predesignated point in a matter of a few short minutes.

The troop carrying capacities of different Army aircraft vary. The L-20 "Beaver" can drop up to four parachutists in a single pass over a drop zone with about a two-second interval between jumpers. The H-19D helicopter can drop five parachutists in a single pass and the H-21C can drop 10 troopers. However, since the H-21C can lift a total of 12 parachutists, it usually will drop them in two passes over the DZ. For example, two sticks of six men each can be carried in one lift, with one stick being jumped on each of the two passes.

It must be fully understood that missions for Army aircraft parachute operations will be restricted to limited objectives. Mass parachute drops and long-range parachute-troop operations will continue to be delivered in Air Force troop-carrier aircraft. Parachuting from Army aircraft will be limited to small-scale operations involving the delivery of squad- and platoon-size reconnaissance patrols, small raiding forces or Army pathfinder teams. The Army's planes are suitable for and capable of performing these important missions. Full exploitation of this capability will depend largely on the initiative and imagination of the commander.

Figure 6. Troopers sit down to exit from the H-19D helicopter.

Survival



INCREASED MOVEMENTS OVER GREAT DISTANCES BY AIR AND SEA TRANSPORT AND OTHER CHARACTERISTICS OF MODERN WARFARE PROMPT US TO KNOW MORE ABOUT SURVIVAL TECHNIQUES.

Could you drop what you are doing right now and walk into a desolate area with nothing in your pocket but a penknife and a cigarette lighter and survive for a week or two—or more? Could you feed yourself? Would you be able to find water? Could you protect yourself against heat or cold? If not you'd better read on. You may find yourself in a situation someday where your ability to stay alive will depend on what you know about survival techniques.

Farfetched? Not so much as you might think. Many officers and men have faced this kind of situation in the past. In atomic or mobile warfare units will be more widely dispersed and may be moved about more often over great distances by air or sea transport. The possibility of your facing such a problem may increase.

By John Gause and Capt Howard Kayner

Mr. John W. Gause served in the United States Navy from 1943 to 1947 as an aerial gunner in Alaska and the Aleutian Islands. After returning to civilian life he earned a degree in journalism at the University of Georgia. Following several years as a newspaper editor and as a public information specialist at The Infantry Center, Mr. Gause joined the Training Literature Editing Section of the Editorial and Pictorial Office, U. S. Army Infantry School.

Capt Howard W. Kayner enlisted in the Army in December 1942 and served in the European Theater throughout World War II. Following his discharge from the service, he attended Indiana University and was commissioned a second lieutenant in 1948. Capt Kayner attended the Armed Forces Information School at Carlisle Barracks and then served as an instructor at the Army's information school in Europe and as a platoon leader and company commander with the 18th Infantry Regiment in Germany. His next assignment was as troop information and education officer at Fort Riley. In 1955 he received a master of arts degree in journalism from the University of Florida. Since then he has been assigned to the Training Literature Editing Section, Editorial and Pictorial Office, United States Army Infantry School.

This is the type of thing most of us feel will never happen to us. Or it is something we'll worry about when and if it does. But, when it happens is too late. The time for you to take the first steps toward survival is now. Today is the time to acquire the "know how" you will need for survival tomorrow.

Survival lessons learned during World War II and in Korea prove that men can live and return to safety under the most dire circumstances if they know what to do. Yet, there is no pat formula for success. Each situation is unique in many respects and must be faced as such. However, all survivors have had some things in common. Probably the most important of these was the *will and determination to survive*. You won't last long without it. Most survivors also have been prepared in some way—either directly or indirectly, consciously or unconsciously—for the emergency before it happened. In some cases this consisted of little more than knowledge acquired as a Boy Scout or experience picked up while hunting, fishing or living in a rural area.

To get into a proper mood for information on survival, imagine you are sitting in the bucket seat of a military aircraft. Slipping under the wing, a mile or more below, is a vast, uninhabited wasteland—mountains, desert, arctic icepack or tropical jungle. Pretend that in a matter of minutes you find yourself catapulted into that area. You have only those items now on your person or in your pockets. Visualize that you have minor injuries or that you have been knocked out and have just regained consciousness. There is no other person around and you don't know for sure where you are. To make matters really tough, you suspect that you may be in enemy territory.

What can you do about your plight? How will you go about keeping yourself alive until you can be rescued or make it back to civilization or friendly lines? With this mental picture and these thoughts in mind, let's take a look at what you can do right now to prepare for survival.

One of the first things you must do is to prepare yourself mentally and psychologically for such an eventuality. While your efforts in this area will be limited there are some things you can do. A good way to start is to realize that this *could*

happen to *you*. Then you must recognize that when it happens things will be really tough. You must start to build confidence in your ability to cope with such a situation. Beware of false confidence based on a disregard or ignorance of how rough things really can be. Genuine confidence is justified only by a full appreciation of what you may have to face and by acquiring the knowledge you will need to pull through. Confidence in your ability to survive will go a long way in warding off panic. It will help also to allay the feeling of hopelessness and the temptation to give up. It can bolster your will to survive.

You can improve your chances of survival by training yourself to sit down and calmly think a situation through—by learning to develop a plan before you act. Moving about aimlessly will waste energy and time, may prove to be dangerous and certainly will reduce your chances for success.

Another thing you should do now is to take stock of what you already know. If you were a Boy Scout you are familiar with many techniques that would help you to survive anywhere in the world. Review what you have learned in your military training. How well do you know land navigation with or without a compass, map, etc.? How much do you remember about first aid, sanitation, personal hygiene, camouflage and other subjects that form the basis for further study in the techniques of survival?

Your next step is to consider the many kinds of special information and skills which you can pick up through daily living, reading and study. Then make a conscientious effort to add to your knowledge.

The many problems of survival can be grouped under three major considerations: food, water and shelter. You must know what you can eat to sustain life, where you can expect to find it and how to determine if it is safe to eat. You must know also where to locate water or other lifesaving fluids and how to make them fit to drink. And last, you must be able to find or provide shelter from heat, cold and the elements.

Locating food generally is not as big a problem as it may seem—not if you know how to do it and particularly if you develop a new conception of what can be put into your mouth to sustain life. There are about 300,000 plants growing on, under and above the earth's surface. Some 50% of these are edible. Add to plants the thousands of walking, crawling and creeping forms of animal life and you have, in almost any area of the world, a sizable food source. Of course, some plants and animals are not fit to eat. Many have little food value, some are dangerous. How do you learn about all of these thousands of food sources? The truth is, no average person will. You can, however, learn to recognize the most common types of edible plants and the most frequently encountered poisonous ones. You can learn also how to "test" those which you do not know.

You don't have to be a botanist to identify many of the plant foods. You are already familiar with hundreds of them—vegetables, fruits, berries, nuts, etc. Many of these grow throughout the world. Most of them you have eaten. Some, however, you have looked upon as flowers, weeds, animal food or as anything but a human meal. But in a survival situation they will provide as much nourishment as some of the things you ordinarily eat.

You know also about many plants which you should avoid such as poison ivy, sumac, certain types of mushrooms, etc. Plants which have milky or colored sap and those with stinging proprerties—nettles, stinging hairs, etc.—should also be avoided.

If you know enough about the familiar plants, for instance the tomato plant, the potato plant, the radish, dandelion, etc. so that you could recognize them in the field anywhere in the world you have a start.

You will take another step forward when you know how to determine the edibility of plants you cannot identify. Most survivors have used two methods—"taste and wait" and "do-like-the-monkey-do." Both are fairly descriptive and accurate. In the first of these methods you take a very small bite of the strange food and wait. If you get the slightest reaction you leave it alone. However, if you have no ill effects try a bit more. So long as you feel well increase the amounts you eat until you know that it is safe. The second method is quicker provided there are birds or monkeys in the area. Simply eat what the birds or monkeys are eating. It may not be the most appetizing thing you ever ate but it won't hurt you.

The next step, of course, is to increase your knowledge about unfamiliar plant life which you will find in various parts of the world. Your efforts in this direction will be simplified if you consider possible plant foods in three simple categories—plants that grow in the water, those which grow in the ground and those found above the ground. It is impossible, here, to cover these food sources in any detail. However, a few types will be mentioned as a guide to further investigation and study.

The water lily is typical of water-growing plants. Both its tender roots and leaves are edible and nourishing. The water chestnut, actually a tuber like the sweet potato, is also found as a free-floating plant on rivers and lakes in both temperate and tropical areas. This plant bears an edible nut which can be recognized by its steerhead shape. Water plants, of course, also include the many varieties of sea weed and dulse, many of which are both tasty and nourishing—raw, cooked or dried.

Plant foods found underground include tubers, roots or rootstalks. The most common tuber is the potato. Another tuber, found in many areas of the world, is nut grass. It grows in moist, sandy areas along the margins of streams, ponds and ditches in both tropical and temperate zones. This grass differs from true grass in that it has a three-angled stem and thick underground tubers that grow one-half inch to an inch in diameter. The tubers are sweet and nutty. You can boil, peel and grind them into flour.

Typical of survival foods found above the earth's surface is the coconut. This familiar nut has proved a life saver for many survivors. It is usable as food in any stage of growth. Besides the nut proper, which is also an excellent source of liquid, the young palm seedlings and palm cabbages are nutritious. The coconut palm grows in the moist tropics near the seashore.

The inner bark of trees—the layer next to the wood—is another food source. It may be eaten raw or cooked. You can even prepare flour by pulverizing the inner bark of cottonwood, aspen, birch, willow or pine trees. Pine bark, incidentally, is rich in vitamin C. The nut of the pine cone is also nutritious.

Now let's consider, briefly, animal foods. Animals, including fish, supply more food value per pound than plants. While they are generally harder to obtain, there is less of a problem in determining those which are safe to eat. All mammals and birds are edible and almost every other form of animal life *can* be eaten. Humans in many parts of the world consider grasshoppers, snails, snakes, insects and other unattractive creatures as delicacies. Our eating habits and prejudices are a definite handicap in a search for food. However, where extreme hunger and the preservation of life

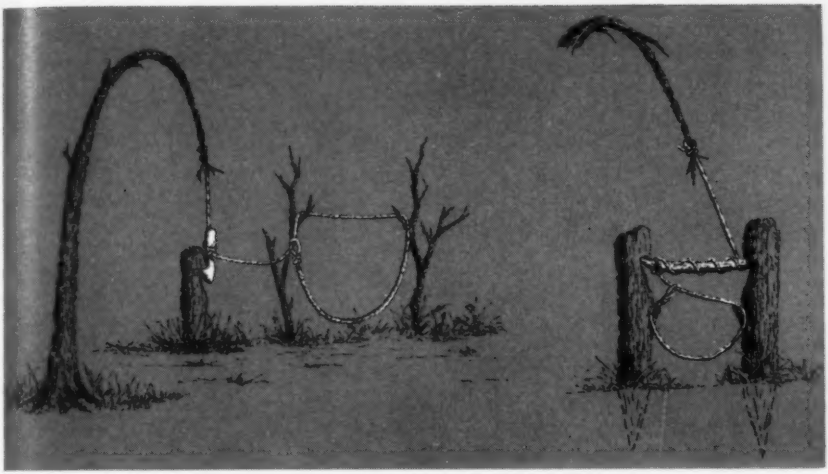


Figure 1. The fixed snare (two versions illustrated) is easily constructed by fastening a loop of light rope or improvised cord to a bent sapling. The loop is held in place by a simple notch trigger mechanism. This snare will catch small game. It achieves best results when placed astride a game trail.

itself determine our choice, unthinkable dishes will be accepted and will provide nourishment.

Wild game and fish provide the most common and most acceptable foods for the average American but they are normally the most difficult to obtain. Clams, oysters, mussels, periwinkles, chitons, etc., are more easily caught. So are frogs, turtles, crayfish, salamanders and snakes. But remember that salt water snakes *are not edible* and that snakes, large turtles, alligators and large wild game should be handled with caution.

Eggs of all kinds and *in any stage of embryo development* are excellent survival foods. Hardboiled, they can be kept almost indefinitely. Nest robbing is a profitable survival pastime. If you can improvise fishing equipment, small traps or snares (Figure 1) go after more elusive fish or game. The techniques are the same as those you would use for hunting or fishing in the vicinity of your home and which are discussed in hunting and fishing magazines. The secrets of successful animal hunting are seeing the quarry before it sees you, staying downwind and studying the animals' feeding and watering habits. Your military training in movement and concealment can be helpful in game stalking.

If at all possible, cook animal food—to kill disease. Roasting over a small fire or in hot coals is the easiest and possibly the best. If you wrap the meat in clean leaves and cover with clay or mud there will be less loss by burning or shrinking. Be sure to leave all fat on the meat as it is rich in food value. Dry excess meat in the wind or smoke it to produce "jerky." Cut the meat across the grain in ¼-inch strips and dry it until it becomes brittle.

The next requirement for survival is water. This may be one of your biggest problems. No matter how abundant your food supply you cannot survive without water. Depending on the area, you re-

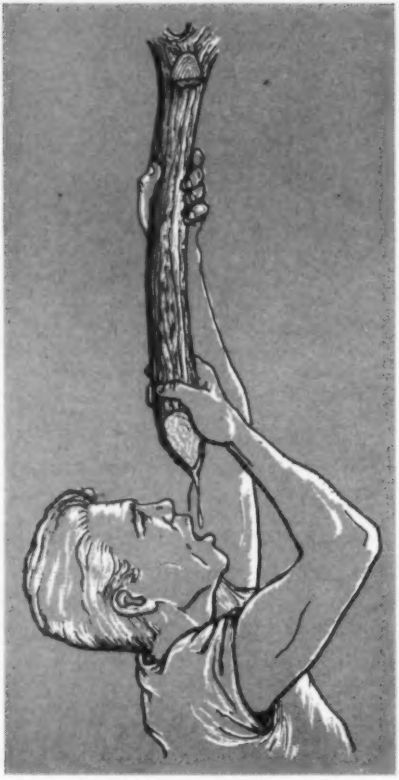


Figure 2. Vines can provide a drinkable liquid.

quire from two to four quarts a day to maintain efficiency. Any lesser amount will cause a slowing of your body functions.

Under no circumstances, can you drink sea or salt water. Unless, by some unusual circumstance, you have equipment for distilling water you must find fresh water.

Consider all water unsafe for drinking. No matter how overpowering your thirst, take precautions against one of the worst hazards to survival—waterborne diseases. *Boil your water!* This will kill typhoid, dysentery and cholera organisms and parasites.

Rainfall is one of the safest sources of water. With a little imagination you can devise numerous ways of catching it. Clear, fast-moving streams with sandy bottoms also provide a good source. But even this water should be boiled.

Less pure but fairly abundant is ground water taken from dry stream beds, lakes and valley floors. A two-foot hole dug in a dry stream bed, for example, may yield enough water for drinking, cooking *and bathing*. A little digging in a green spot on the valley floor where there was once a spring will often produce pure water.

Use run-off water collected in stagnant pools or bogs as a last resort.

After exhausting the possibility of securing water from the ground, you can rely on certain land plants to provide a potable liquid. However, this liquid is not water and, generally speaking, will not satisfy your thirst.

The coconut is the most familiar liquid-containing plant. Green coconuts contain more milk than ripe nuts and you can open them easily with a knife or even with your bare hands. Use the milk of mature nuts with caution because it contains a high percentage of oils which act as a violent purgative and will make you nauseated. Drink no more than four cups of this milk in a single day.

Many vines also contain a drinkable liquid. By experimentation, you should find some that will fill your needs. Cut a deep notch high up into the vine, cut the vine off close to the ground and let the fluid drop into your mouth or a container. When the liquid ceases to drip, cut another section off the top. Continue this process until the supply is exhausted. A new FM on survival, when published, will illustrate some of these vines.

Animal blood is drinkable but like plant fluids it is not thirst-quenching. It is difficult to store because it congeals quickly. Lobsters and crabs contain a

fluid which many survivors have found useful when no other source of fluid was available.

Much has been written about squeezing the flesh of fish to obtain a drinkable survival liquid. In theory, this could be done. However, in practice not enough pressure can be applied to the flesh to make it give up its liquid. But you can chew or suck this flesh to relieve the "cotton" dryness in your mouth. Spit it out when it ceases to serve the purpose.

Fire with which to boil water can be a real problem. This is the reason a lighter or some other means of making fire is considered an absolute must for survival and is an item that should be carried by every soldier at all times. Lacking such means every effort must be made to start a fire with primitive means such as a bow and drill made from dry wood (Figure 3) and a shoe lace or by striking a spark with a piece of steel and flint. And remember, when concealment is necessary your fire must be smokeless.

Last on the list of your survival requirements is shelter. You must have protection from excessive cold, heat, sun, rain, insects, etc.

The word "shelter" does not imply a permanent dwelling. More often it will be a cave, a rock overhang, a hollow tree or stump, or protective terrace or bank. In the absence of these natural shelters you will have to build or dig some type of protection using whatever materials are available. A simple lean-to can be made from a few tree limbs or timbers and covered with boughs, grass, leaves, bark, etc. (Figure 4). A parachute,

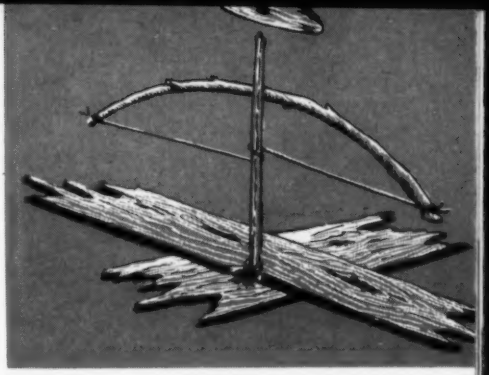
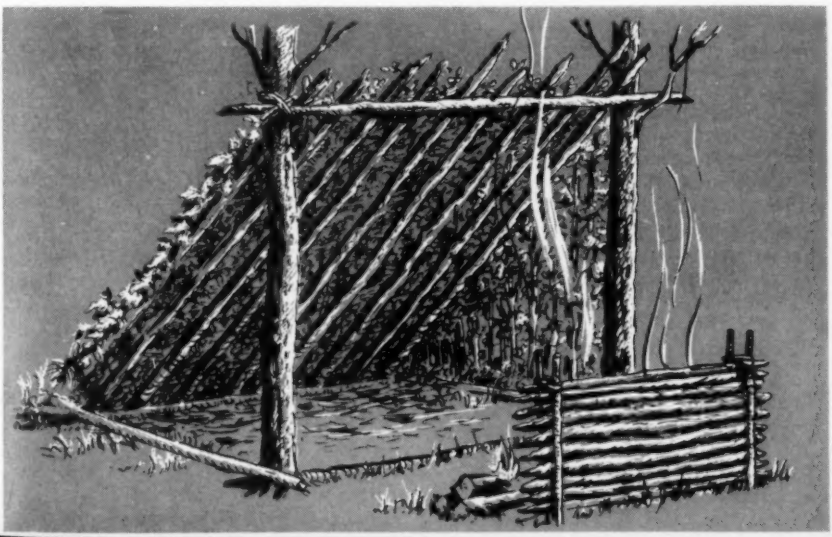


Figure 3. A bow and drill for making fire can be improvised if dry wood is available. Items needed are a stone with a hollow or smooth depression, a branch for a bow, a shoe lace or thong and a dry, straight wood shaft. The shaft is held in place by pressure on the stone and is spun against another piece of dry wood into which a notch is cut. Dry, finely shredded tinder is placed in the notch. As wood rubs against wood under pressure friction will ignite a spark in the tinder which can be carefully fanned into a flame.

Figure 4. A simple lean-to will provide emergency shelter and is easy to construct. Be cautious of fires in enemy territory.



rocks, snow, even ice blocks, can be used under certain circumstances to provide protection from the elements. The Boy Scout manual or camp lore publications provide valuable information on expedients you might find useful.

Many survival situations are brought about by a plane crash. In some cases the crashed or ditched ship itself is used, but in many survival situations this has proved impracticable. The airplane is much harder to heat than a well-constructed outside shelter—the metal collects frost.

Materials for even the most simple shelter are not always available. In the desert for example you may have to seek out other means of warding off the sun and sand and cold. Burrowing into the sand may be the only protection you can provide. You must do the best with what is available. Most survivors who have endured the hardships of living in the open for extended periods emphasize that some type of shelter is necessary.

At this point let's review the steps you have taken toward survival. You've learned that you can eat just about everything—plants, animals, insects, reptiles, birds; that you must have water and a knowledge of how to make it potable; and that you must protect yourself from the elements.

The importance which the Army now attaches to the subject of survival in modern warfare is indicated by the preparation of a survival field manual. The text for this brand new manual has been completed here at the U.S. Army Infantry School and forwarded to Headquarters U.S. Continental Army Command for final review. When published its some 320 pages and 235 illustrations will provide comprehensive information on survival techniques which will be important to Infantrymen under adverse conditions anywhere in the world.—Editor.

Is this enough information to keep you alive in a real emergency? Obviously it isn't. But it's a start. The rest is up to you. Take a look at your son's Boy Scout manual. The next time you're in a barber shop pick up one of the hunting and fishing or outdoor magazines. Get out in the open on weekends. Learn more about living out of doors. Get to the library for additional reading that could help you to survive. Here is a list of publications that cover various aspects of survival in more detail. You will find them worthwhile reading.

Aviation Training, Office of the Chief of Naval Operations, USN, *How to Survive on Land and Sea,* copyright 1951, US Naval Institute.

Air Force Manual 64-3, *Survival Training Edition.*

Air Force Manual 64-5, *Survival.*

Strategic Air Command Land Survival Guide Book.

FM 21-75, *Combat Training of the Individual Soldier and Patrolling.*

FM 21-(?), *Survival* (being written).

Air Force Review, Winter 1952-53, *Survival Training.*

Arctic, Desert, Tropic Information Center Publication D-102, Maxwell AFB, Alabama, *Sun, Sand and Survival.*

Intelligence Bulletin, September 1943, *Living in the Jungle.*

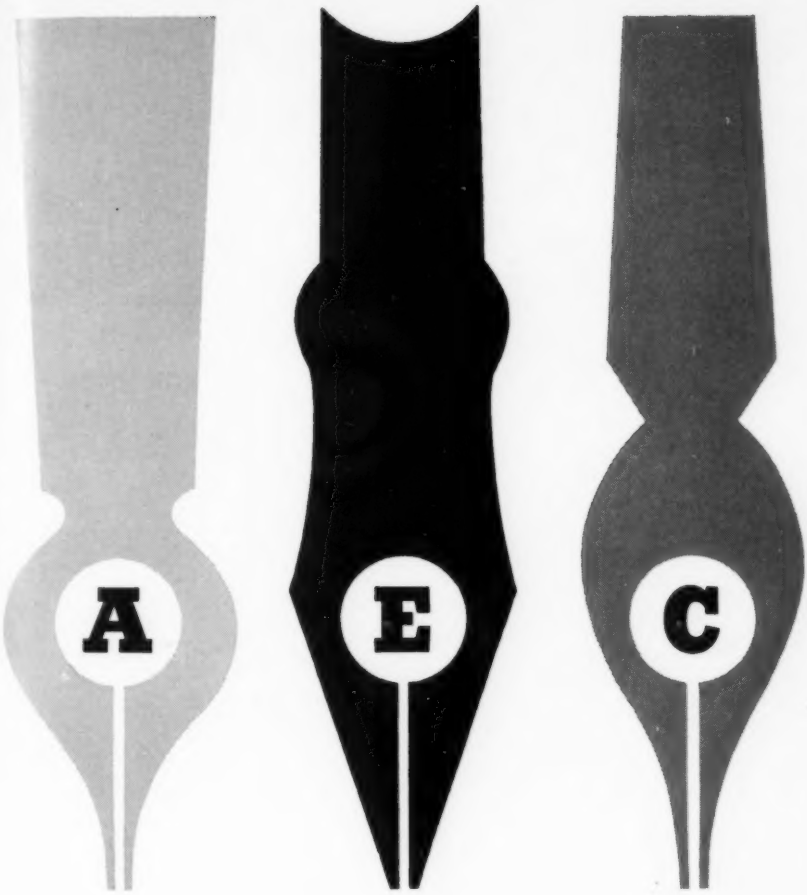
Samuel A. Graham and Earl C. O'Roke, *On Your Own,* University of Minnesota Press, copyright 1943.

Arctic, Desert, Tropic Information Center Publication D-100, March 1951, *A Foot in the Desert.*

Arctic, Desert, Tropic Information Center Publication A-100, 1953, *999 Survived.*

Arctic, Desert, Tropic Information Center Publication A-103, April 1953, *Down in the North.*

Boy Scout Handbook.



Points to Consider

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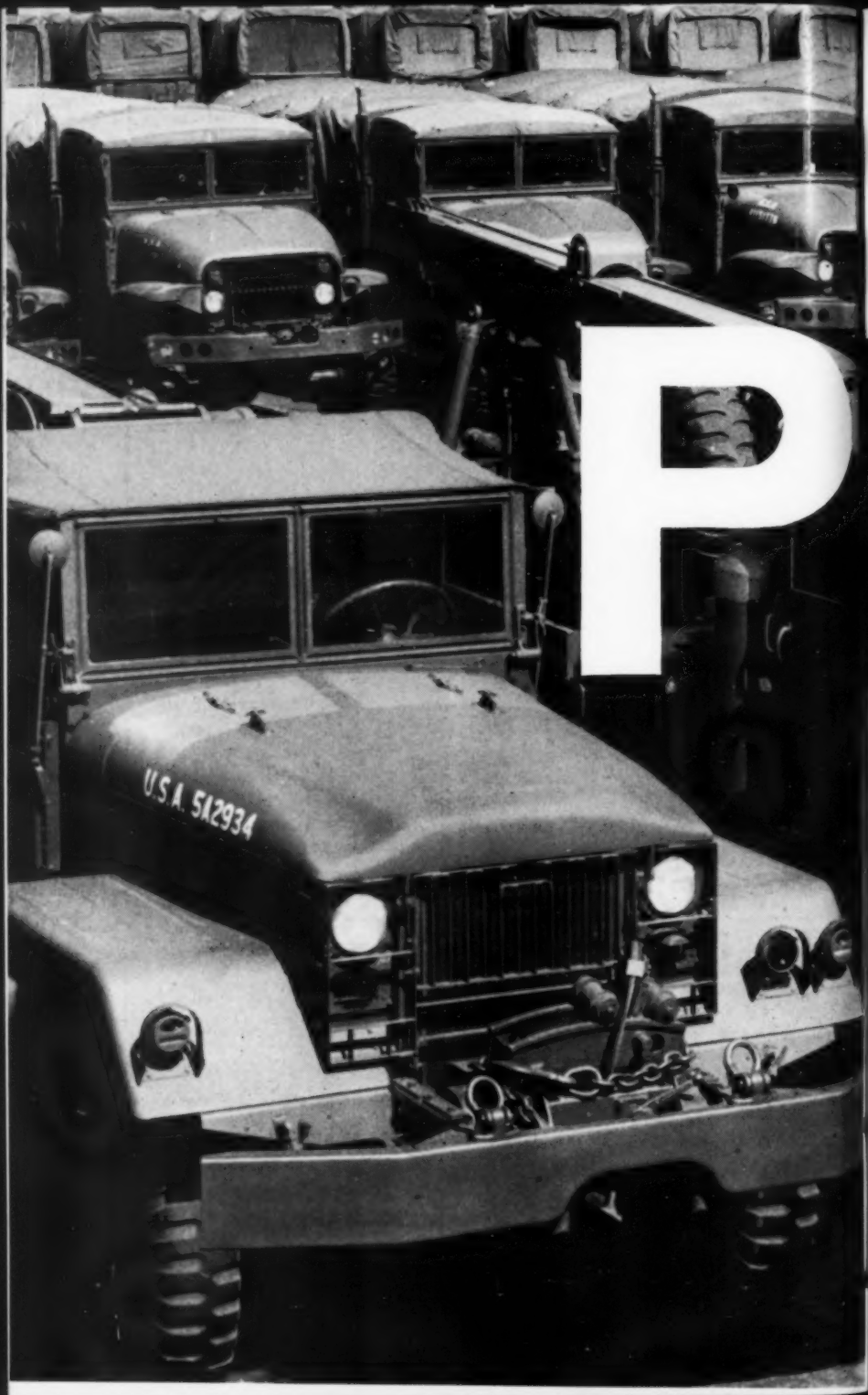
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Systematic vehicle inspections, using preventive maintanance indicators to help you know what to look for and where to look, will insure the combat mobility of your unit.

MI*

*PREVENTIVE MAINTENANCE INDICATORS

Ground mobility has become increasingly important in this age of atomic warfare. Considerations of small unit task forces or pentomic battle groups must include careful study of dependable means of transportation. Indications are that vehicles will be required to withstand intense usage during long periods of combat. Normal garrison duty is now complicated by a marked reduction in organic vehicles and maintenance personnel. Our ground vehicular mobility is more directly dependent upon the success of our maintenance and inspection program. We no longer have any buffer of extra vehicles to do the job of those deadlined.

Before the coming of the battle group, the Infantry regiment had a large number of vehicles and maintenance personnel. There were 346 trucks, 25 tracked vehicles and 242 trailers. The 91 maintenance personnel organic to the regiment were spread through the five separate companies and three battalions to provide complete maintenance coverage for all first and second echelon organizational maintenance. Today the commander of a battle group has 122 wheeled vehicles, eight tracked vehicles and 99 trailers. To assist his motor officer, there are a warrant officer maintenance officer, two motor sergeants, 19 mechanics, a wrecker operator and a parts specialist. These

This article was prepared through the combined efforts of Lt Col Mills C. Hatfield, formerly of the USAIS Ground Mobility Department and now assigned to the Army Security Agency, and Capts Carl W. Elvington and Vernie G. Tosh, Ground Mobility Department, USAIS.

figures represent a reduction of 66% in vehicular strength and 74% in maintenance personnel.

Supporting vehicles and armored personnel carriers may be attached to the battle group from divisional or higher units. These units may send a maintenance section along with the vehicles, or maintenance personnel may be sent down at regular intervals to inspect their vehicles and perform the maintenance. However, conditions may prevail where the battle group may be required to provide maintenance support for these attached vehicles. This requires the small unit commander to exercise much closer supervision over his transportation—whether organic or attached. We are now required to produce more mobility with less transport. More attention must be paid to utilization and maintenance.

Maintenance is a commander's responsibility. Whether a squad leader or battle group commander, you must insure your mobility through an effective vehicle inspection program. To be effective these inspections must be well organized and must be based on professional "know-how." The individual who bluffs his way through an inspection fools no one but himself.

There are many different types of inspectors. Some feel that they know all about vehicle inspections, but actually know little. Their inspections usually concentrate on dirt and rust. Their "gig lists" are full of indefinite remarks such as, "dirty," "unsightly," "needs paint," etc. The result of these inspections is that soon all vehicles come to shine in places that do not matter, and as time passes less and less attention is paid to mechanical condition. Another type of commander admits that he knows little about vehicle inspections and, consequently, seems to have an innate fear of them. These commanders also tend to concentrate on the outer appearance of the vehicles. Still other commanders compensate for their lack of knowledge by becoming hipped on one point such as tire pressure, fan belt deflection or oil level. Lacking even a basic understanding of the functioning of these components they establish an exact set of standards, any variation from which is classified as a deficiency. Too often these arbitrary standards turn out to be false. Tire pressures must be inspected before operation to be true readings; fan belt deflection will vary depending on the weight applied by the inspector. Naturally, these inspections fail to obtain the desired results. The vehicles may look good, but are they safe? Will they run?

Many leaders in the Army feel that they are not qualified to inspect our military vehicles, despite the fact that almost all drive a car. Ineffective inspections result from the opinion that maintenance is for the specialist and from fear that they might display some ignorance of the subject.

You need not be an automotive specialist to conduct proper inspections. Since mobility depends on maintenance, an inspection which insures adequate maintenance will insure mobility. With a little study and organization, any commander can conduct a thorough inspection. Excellent aids for the organization of an inspection are preventive maintenance indicators. The term "indicator,"

as used here, means "a simple check point." The condition of appropriate check points will give a good over-all indication of the effectiveness of the unit's motor vehicle preventive maintenance program. Each check point gives the inspector a specific item for which to look when inspecting any vehicle component.

Perhaps you have wondered, how can you inspect all of the many check points on each vehicle in the limited time available? The answer is simply that you cannot. Before an inspection, select certain preventive maintenance indicators from the different vehicle systems, then inspect each vehicle in the same manner with the same information in mind. The inspection should follow a definite sequence. Check points should be examined in the same order. This insures complete coverage of each vehicle, facilitates recording of results, makes preparation for the inspection simpler and speeds up the inspection. In subsequent inspections, pick different PMIs. Over a period of time, this will insure good maintenance and will give you an accurate picture of the condition of your vehicles.

Before beginning any inspection, go over the list of PMIs with the motor officer. Ask him about specific indicators you intend to use. Check the appropriate technical manual for the vehicles you intend to inspect.[1] Most of the difficulty encountered in the use of the preventive maintenance indicator technique stems from ignorance of nomenclature and purposes of various vehicle components. There is no substitute for study to overcome this weakness. In addition to the basic TM for each vehicle, TM 9-8000, January 1956, Principles of Automotive Vehicles, gives a graphic description of every vehicle component.

Just how does the preventive maintenance indicator system work? While each element of a vehicle will have its own individual indicators, all of these numerous check points can be combined into nine basic PMIs (Figure 1). The commander using this list should note first that no special knowledge is required to detect such items as leaks, noises, loose or missing parts, cracks, damage or abuse, and dirt; i.e., items 2, 3, 5, 6, 7 and 9. Items 4 and 8, lubrication and adjustment, in all probability will require that even an experienced inspector consult the technical manual for the prescribed maintenance specifications. Item 1, performance, is an extremely important indicator —one that is frequently overlooked in the commonplace eyewash inspections. The fact that vehicles are lined up and washed, tools carefully laid out, bumper markings correct, and all the other indicators satisfied does not mean that the vehicles will run properly.

Many inspectors limit their inspection of the engine to a check of the oil level

Figure 1. Basic PMI.

BASIC PREVENTIVE MAINTENANCE INDICATORS

1. *Performance*
2. *Leaks*
3. *Noises*
4. *Lubrication*
5. *Loose or Missing Parts*
6. *Cracks*
7. *Damage or Abuse*
8. *Adjustment*
9. *Cleanliness*

[1] ¼-ton 4x4 M-38A1: TM 9-8014, April 1955; ¾-ton 4x4 M-37: TM 9-8030, May 1955; 2½-ton 6x6 M-34, M-35: TM 9-8022, December 1954.

PMI - ENGINE SYSTEM

Air-Fuel	1	2	3	6	7	8	9
Compression	1	3	4				
Ignition	1	3	5	6	7	8	9
Exhaust	2	3	5	6	7		
Cooling	2	5	6	7	9		
Lubrication	2	4	5	7	9		

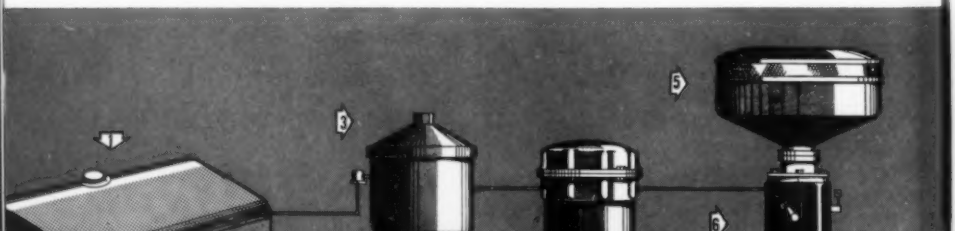
Figure 2. Basic PMI (see figure 1) which are applicable to components of the engine system.

on the dip stick and a check of the coolant level in the radiator. Naturally this will fail to give an accurate picture of the condition of the engine. Understanding this complex piece of machinery is simplified if the engine is considered to be composed of six major systems (Figure 2). These are the air-fuel, compression, ignition, exhaust, cooling and lubrication systems. Inspections of automotive engines are simplified if these six systems are considered individually and inspected as such.

The air-fuel system (Figure 3) consists of the fuel tank, fuel lines, fuel filter, fuel pump, air cleaner, carburetor, governor, intake manifold and intake valves. When inspecting this system using the preventive maintenance indicator technique, deficiencies become quite apparent. A badly dented fuel tank cannot carry its rated volume of fuel. Moreover leaks are quite likely to develop in damaged areas due to weakened seams or rust. A small plug is located in the bottom of the tank for checking the fuel. A sample of fuel taken here will show up any impurities. This inspection is most important during tactical operations where fuel is being transported and supplied from five-gallon cans, the source and contents of which are frequently unknown.

The pressurized gas cap on Army vehicles reduces formation of water in the tank by condensation. A slight hiss or rushing noise heard upon first opening the cap will indicate proper functioning of the valves and gasket. They should also be checked for cleanliness and condition.

Figure 3. PMI'S FOR AIR-FUEL SYSTEM. (1) *Fuel Tank:* Valves in gas cap not operating, cap gasket not sealing, leaks, dents or rust in tank, dirt or water in fuel, tank brackets loose. (2) *Fuel Lines:* Kinks, crimps, dents, loose connection, leaks. (3) *Fuel Filter:* Leaks, rust or dirt, excess water, insecurely mounted. (4) *Fuel Pump:* Loosely mounted, leaks. (5) *Air Cleaner:* Low or dirty oil, clogged air passage, loosely mounted. (6) *Carburetor:* Insecurely mounted, leaking fuel, accelerator linkage loose or damaged. (7) *Intake Manifold:* Loosely mounted, cracked, leaking gaskets.



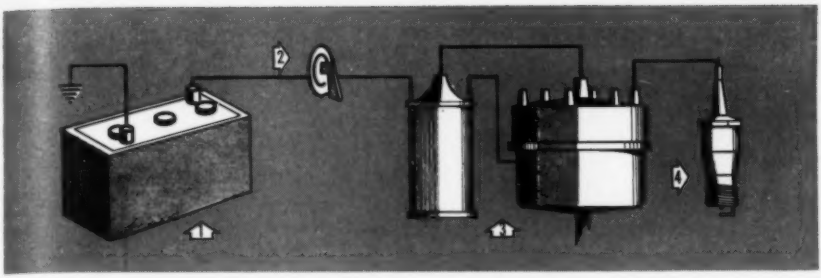


Figure 4. PMI'S FOR IGNITION SYSTEM. (1) *Batteries:* Mounting brackets loose, cracks in case, dirt or corrosion on case and caps, loose cable connections, improper water level, weak charge. (2) *Ignition Switch, Wires and Cables:* Loose or dirty connections, breaks or frays in insulation. (3) *Coil and Distributor:* Loosely mounted, cracks in cap, contact points dirty, excessive pits on points, improper gap. (4) *Spark Plugs:* Dirty, cracks, burnt or eroded electrodes, improper gap, loose connections.

Fuel lines should be checked for leaks, sharp bends, loose connections and crimps. Leaks cause loss of fuel and are a fire hazard. Sharp bends, crimps and other restrictions in the lines may cause fuel starvation, particularly at high speeds.

The fuel filter, if mounted in the engine compartment, should be inspected for cleanliness and leaks. The contents may be checked by removing the plug from the bottom and examining the fuel which escapes for water and dirt. If the filter is mounted in the fuel tank, it should be checked for proper operation.

Inspection of the fuel pump consists of checking mounting, leaks and proper operation.

The air cleaner removes dirt and grit which could cause extreme engine wear. Check the oil level in the bottom of the air cleaner by removing the filter and top. The oil should be checked for dirt by rubbing it between the fingers. The filter should be inspected for cleanliness.

The primary test of the carburetor is its performance—its ability to provide the proper amount of air and fuel to the engine under varying conditions of speed and load during operation of the vehicle. During a formal inspection on line you should look for secure mounting, cleanliness, leaks and proper functioning of the linkage. A governor may be located just below or as an integral part of the carburetor. Inspection is limited to a check of the wire seals which prevent tampering.

The last component of the air-fuel system is the intake manifold. It is merely a specially shaped pipe which carries the fuel mixture to the cylinders. Check it for secure mounting, leaks, cracks and cleanliness.

The compression system will not be checked in detail during a normal inspection. This system consists of those internal engine parts which enclose and harness the explosive power. Preventive maintenance indicators include loss of compression resulting in hard starting, misfiring and rough idle, excessive oil consumption or presence of water in the crankcase oil. Operation of the vehicle is the true means of checking for most of these indicators. If you desire, you can direct a mechanic to perform a compression test. Each vehicle TM will tell you what the limits are for compression variance for that vehicle. If squirting oil in the cylinder brings the reading back within normal limits for a little while, this is a good indication that the piston rings are excessively worn.

The ignition system (Figure 4) consists of the batteries, a series of wires and

cables, the ignition switch, the distributor, the spark plugs and spark plug wires. This system is the cause of 90% of all engine troubles. For that reason, it must be given a high maintenance priority.

The battery is the weak link in this system. Its most important check point is proper electrolyte level. If the level is too low, the battery may be damaged to such an extent that it will no longer take a full charge. If the level is too high, some of the electrolyte may spill, causing corrosion and leaving a weakened solution in the battery. The proper level is from ⅜ to ½ inch above the plates, unless otherwise indicated. Some batteries have marks to show proper level.

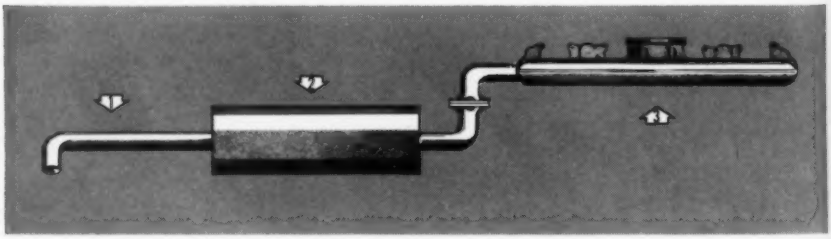
Batteries must be inspected for cleanliness. Corrosion should be cleaned off with a mixture of water and baking soda to neutralize the acid. A light coat of grease should be applied to the top of the battery posts after the straps have been securely fastened. Another important check is the tightness of battery brackets. In rough terrain a loosely held battery may crack after a few miles of operation; loose battery cables may jump off the terminals.

The series of wires and cables connecting the parts of the ignition system should be checked for general condition to insure that all connections are clean and tight, and that the insulation is not frayed or worn. The distributor is best checked by operating the engine to see that it runs smoothly. Spark plugs may be removed to check for carbon, badly burned electrodes or improper gap. Again, smooth engine performance is the best check of the ignition system.

The fourth major system is the exhaust system (Figure 5), consisting of the exhaust manifold, exhaust pipe, muffler and tail pipe. Bends or restrictions in this system prevent complete removal of exhaust gases from the cylinders. This cuts down on the amount of new fuel mixture which can be drawn into the cylinder, resulting in loss of power. Cracks or leaks in this system can allow dangerous gases to escape into the passenger compartment.

The cooling system (Figure 6) carries the excess heat from combustion and friction away from the engine, allowing it to operate efficiently. Once assured that the coolant is clean and at the proper level, check for leaks in the radiator and around all connections. The radiator cap should be checked just like the fuel tank cap. Leaves or mud in the front of the radiator will prevent proper cooling. Paint, oil or grease on the hoses will cause deterioration. The fan belt tension is checked between the water pump and generator. Each vehicle technical manual lists the proper deflection. If the belt is too tight, the bearings in the generator

Figure 5. PMI'S FOR EXHAUST SYSTEM. (1) *Tail Pipe:* Cracks, dents, corrosion, end crimped or plugged. (2) *Muffler:* Dents, cracks, corrosion. (3) *Exhaust Manifold:* Cracks, leaking gasket, loosely mounted.



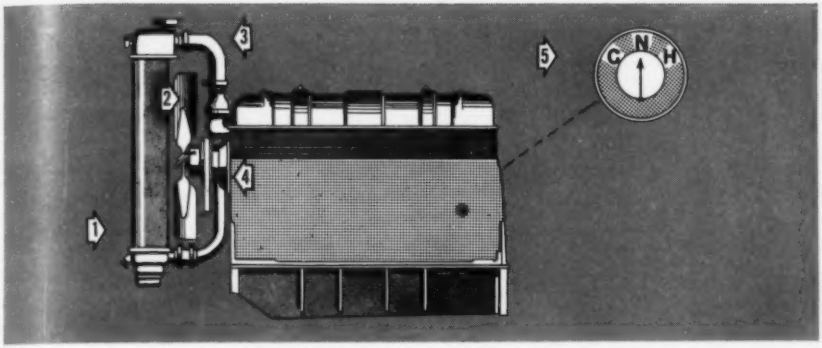


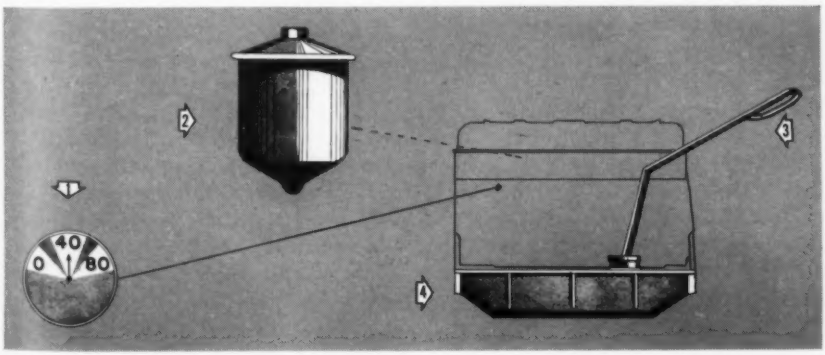
Figure 6. PMI'S FOR COOLING SYSTEM. (1) *Radiator:* Valves in cap not operating, cap gasket not sealing, low coolant level, radiator loosely mounted, leaking or dirty. (2) *Fan and Fan Belt:* Bent or broken blades, bent, loose or missing shroud, belt frayed or dirty, belt improperly adjusted. (3) *Hoses:* Loose connections, leaks, cracks, dirty. (4) *Water Pump:* Unusual noises, leaking, loosely mounted. (5) *Temperature Gage:* Not operating.

and water pump may be damaged. If too loose, the belt will wear rapidly and the water pump and generator may not operate properly. Checking the heat gauge during operation will indicate if the thermostat is present and functioning properly.

The lubrication system (Figure 7) serves four purposes: lubrication, cleaning, cooling and sealing. The lubricant acts as a liquid bearing surface between nearly all the moving parts of the engine. A detergent added to the oil acts as a solvent for dirt and carbon, cleaning the engine. While in motion the oil carries heat away from the moving parts to the oil pan where it is dissipated. Finally it completes the seal between the piston rings and the cylinder wall, improving compression.

Oil level and cleanliness may be checked at the same time. If the engine has been operating, wait a few minutes to allow the oil to drain into the pan,

Figure 7. PMI'S FOR LUBRICATION SYSTEM. (1) *Oil Gage:* Low pressure reading or not operating. (2) *Oil Filter:* Insecurely mounted or leaking. (3) *Lubricant:* Improper type, presence of dirt, water or grit, improper level. (4) *Oil Pan:* Dirty exterior, leaks or dents.



then check proper level on the dip stick. Rub the oil from the stick between your fingers to check for dirt or grit. Examine the oil for presence of water. Dark color in itself does not mean that a detergent oil needs changing. The oil pan must be free of dents which would limit its capacity and must be reasonably clean. If dirty on the outside, the air flow around the pan will not cool the oil, and in turn the oil will not properly cool the engine.

It should be obvious that the use of the PMI technique organizes motor vehicle inspections. All the check points listed for the engine systems are simple in nature. Their use does not require disassembly of any major components. This same technique can be used for inspections of the power train, running gear, frames, cabs and bodies. A brief study of the appropriate technical manual for each vehicle will prepare any commander for an inspection of this type.[2] There is no short cut or substitution for this study.

The commander's inspection of motor vehicles must not be limited to the formal or informal type of inspection conducted in the motor pool. His inspection must be continuous. Unit leaders must be indoctrinated with the need for detecting and reporting evidences of impending mechanical failures. Many opportunities are provided since most of us are users of transportation. One simple but effective technique is to visually inspect the unit's vehicles as they pass by in column. You should select a vantage point along the route where the vehicles will be moving slowly. Careful observation of each vehicle from front to rear will indicate such things as poor appearance, poor driving practices, improper markings, improper loading, low tire pressure, overheating, missing parts, torn tarpaulins and extraneous noises. Under combat conditions this method may be the only one possible for extended periods of time.

You as a commander will insure mobility by the establishment of a sound preventive maintenance program within your unit. You must continually inspect your vehicles as a part of this program. Unless you are competent to do so, you are unable to lend the proper amount of command support to your maintenance personnel. You can never be really sure whether or not your vehicles are being maintained in a condition of combat readiness. The skill with which the commander of the future can make this determination may well be an important factor in measuring his fitness for command, since the combat effectiveness of any unit depends to a large degree on the condition of assigned motor vehicles. This is especially true in modern warfare when mass destruction weapons may be employed and mobility is so vital to success.

2 Preventive maintenance indicators are listed and illustrated in detail in the United States Army Infantry School's publication, "Commander's Automotive Preventive Maintenance Training Program."

Today's Army is well along in transition from powder to atomics, from cannon to missiles, from trucks to helicopters, and from field glasses to airborne television. . . . In building this Army of Tomoroow, emphasis is laid upon the development of maximum flexibility in all its aspects so that the Army can get its troops where they are needed, when they are needed, and with the punch needed to accomplish every specific task it might face.

SECRETARY OF THE ARMY WILBER M. BRUCKER

TIPS

For newly commissioned ROTC officers entering active military service.

Here are a few tips which should save you time . . . money . . . worry.

By Lt Bernard F. Agnelli

A majority of the officers entering the Army today are ROTC graduates. Unlike officer candidates or United States Military Academy cadets, most ROTC cadets take their training in a civilian atmosphere. Consequently, it is only natural that they will have many questions about military duty, particularly those first few weeks on an army post. The newly commissioned officer wants to know how to report for his first assignment, what uniforms to buy, how much he will be paid, what he should bring to his first post, what housing is available. There will be other questions but these are of immediate concern to the officer preparing to report for active duty.

The information that follows may assist you, the new lieutenant, and it may make your transition from civilian to military life smoother. It answers many of the questions most frequently asked by new officers.

Reporting for Duty

You will have little difficulty in finding out where to report. Most posts display a sign reading "Incoming Personnel Report Here"—you can't miss it.

If you're assigned to a unit, report to headquarters, ask for the adjutant or his assistant and follow his instructions. Of course, the military police at the outpost near the entrance of most installations or other persons on the post will be glad to direct you.

Report early (between 0900 and 1100) to have time to get oriented and settled down. Wear the prescribed semidress uniform. At Fort Benning, for example,

the winter uniform is normally worn between November and April, the summer uniform from April through October. Summer and winter uniform seasons begin at different times in different areas. So check on this point—especially if you're reporting for duty in April-May or September-October.

Be prepared to leave a copy of your orders when you sign in.

Your Military Orders

You will need copies of your original orders for a number of purposes. Therefore, it is advisable to bring with you at least 25 copies of the orders directing you to report to your first post. If your army area does not give you 25 copies of these first orders you will have to prepare certified true copies. To do this, type the heading exactly as it appears on the original. You then type, verbatim, the body of the order. If your name occurs only in one or two of a number of paragraphs you need not type the paragraphs which do not pertain to you. In this case, type the word "EXTRACT" at the top of the page and type a line of asterisks (*******) wherever a paragraph or paragraphs have been omitted. Finally, type the command line, signature blocks and official line. Where signatures appear on the original, type in the signed name, preceded by ss//. (For example, ss// John H. Wilson.) At the bottom of the page type "A CERTIFIED TRUE COPY" and sign your name, grade and branch.

Your Military Pay

As a second lieutenant without prior service and without any dependents you will receive $222.30 a month basic pay plus $47.88 for subsistence. Your monthly check will be approximately $240, because about $30 will be deducted from your basic pay for withholding tax. If you are married and declare two exemptions (yourself and your wife), you will receive, in addition to your basic pay and subsistence allowance, an $85.50 rental allowance (if adequate government quarters are not furnished). Your withholding tax will be cut by $10, making your monthly check $335. Only basic pay is taxable as income; your subsistence and rental allowances are not taxable.

Student officers attending service schools on temporary duty (TDY) orders receive per diem at the rate of $4 per day. (Officers assigned to a basic officer course usually are on TDY. However, officers on active duty for six months, under the RFA program, are *not* on TDY and do not receive per diem.)

Most officers deposit their monthly checks in a checking account. However, students attending a basic course often encounter some difficulty in reaching post banks during business hours—which are usually a student's duty hours. To prevent such inconvenience and to save time, you would do well to request the post finance office to send your government check to a local or home town bank for deposit to your checking account. A word of caution about checks: Be absolutely certain that your bank balance is sufficient to cover every check you write. Bad checks are frowned on by the military and they will get you into considerably more trouble and embarrassment in the Army than in civilian life. So be especially careful with your pen and checkbook.

You will need some money until you receive your travel pay and clothing allowance. A single man should plan to arrive at his first duty post with about $50 or $60. This should be sufficient to pay for meals and take care of incidentals. Married men with dependents will need this much (at least), plus $100 or $125

for their first month's rent and deposit on an apartment.

If you remain in the Army over 90 days, and are not Regular Army, you'll receive a $300 uniform allowance as soon as the necessary forms are processed—usually within two weeks after you report. Those who remain on duty less than 90 days receive $200. Within two weeks, you should receive travel pay (6¢ per mile) from your home to your new post (if you pay for your own transportation). However, the nearest Army transportation office can provide you with a train or airline ticket. In that case, you'll be paid per diem at the basic rate of $9 for each day of travel. The Army also pays for transporting your dependents, *unless you are assigned only for temporary duty*. Check with the finance officer at your first *permanent-duty* station about travel pay for your dependents.

Uniforms and Equipment

It's best to have some of your military clothing before you report. However, because many newly commissioned officers have only a limited amount to spend before being issued their uniform allowance, they prefer to buy a starter set of uniforms as soon as they receive their orders. A good starter set should include two sets of fatigues, one fatigue cap, one set of greens or khakis (with caps), boots, low-quarter shoes, socks, ties, belts and insignia. You can buy these items at the Quartermaster Clothing Sales Store of any nearby Army installation. Just show them a copy of your orders. The summer uniform prescribed for most Army posts consists of cotton khaki (shade 1) shirt, trousers, AG 44 garrison cap; web belt; black socks, shoes and tie. The winter uniform is Army Green (AG 44) coat, trousers, service cap; shade 46 cotton shirt; black socks, shoes and tie.

Officers attending the basic Infantry officer course at Fort Benning will wear the fatigue jacket and trousers, blocked field cap and combat boots most of the time. Field equipment—helmet and helmet liner, field pack, cartridge belt, first aid pack, canteen, etc.—is issued to students by their student company.

Table of Allowances 21 (14 November 1956) requires that all officers own or purchase the following uniform items. Prices are for the Quartermaster Clothing Sales Store at Fort Benning. Similar prices will be charged by QM stores at any post to which you may be assigned.

Fatigue uniform:

2 shirts @ $2.25	$ 4.50
2 trousers @ $2.20	4.40
2 caps @ $.81	1.62

(Many posts and units require that the fatigue cap be worn with a stiffener. This is not sold by the QM store but can be purchased in the PX for about $.35.)

Cotton khaki, shade 1 uniform:	
4 long-sleeve shirts @ $2.85	$11.40
4 trousers @ $3.25	13.00
In lieu of two of the full-length uniforms, TA 21 provides that officers may purchase two sets of the new short uniform:	
2 short-sleeve shirts @ $2.65	5.30
2 knee-length shorts @ $2.35	4.70
3 pair knee socks shade 115 @ $.65	1.95
Tropical worsted uniform:	
1 coat	$10.00
2 trousers @ $7.30	14.60
1 service cap	3.70
1 garrison cap	1.00
2 TW shirts @ $5.60	11.20
Army Green (AG 44) uniform:	
1 coat	$24.40
2 trousers @ $7.55	15.10
Matched coat and one pair of trousers, cut from the same bolt of material, cost $37.60.	
1 AG 244 service cap[1]	12.50
1 AG 44 garrison cap[1]	2.60
Army Blue uniform:[1]	
1 coat	$46.25
1 trousers	23.75
1 cap	17.25
1 pair shoulder straps	11.00
You will also need a black bow tie (square-tipped) and white civilian shirt for wear with the blue uniform.	
2 cotton poplin shade 46 shirts (for wear with the AG 44 uniform and with the tropical worsted coat) @ $2.30	$ 4.60
2 black neckties @ $.60	1.20
1 shade 79 overcoat	37.00
3 pair black socks @ $.25	.75
5 pair cushion sole wool socks @ $.55	2.75
1 pair black low-quarter shoes	5.50
2 pair service boots @ $7.45	14.90
1 web belt	.25
1 belt buckle	.10
2 pair glove inserts @ $.75	1.50
1 glove shell	1.70
2 pair insignia of rank (metal) @ $.40	.80
2 pair insignia, US (metal) @ $.30	.60
2 pair branch insignia (metal) @ $.30	.60
1 cap insignia (metal) for the service cap	.24
4 white T shirts @ $.45	1.80
4 undershorts @ $.50	2.00

Simple arithmetic will tell you that your military wardrobe will cost $304.31 (based on buying two sets of full-length khakis and two sets of abbreviated khakis). However, you should plan on spending more than this figure. For instance, for the basic course at the U.S. Army Infantry School you will need *at least* five sets of fatigues. You may also want to buy extra belts and buckles, a pair of jump boots (for parades or inspections) in place of one pair of QM service boots (for field wear), a raincoat, or extra sets of khakis. If you want your uniforms tailormade by a civilian concern for better appearance, they will cost more. And you should plan on spending $20 or $30 (the QM Clothing Repair Shop will do it for less) for alterations to uniforms purchased at the QM sales store. It's also a good idea to get a footlocker or a trunk which you can lock.

At most posts cloth insignia may be worn on the collar and cap of the field (fatigue) uniform. Brass insignia is easily scratched during field work and becomes unfit for wear with the service uniform. Cloth insignia of rank (for cap and right collar tab) costs $.17 a pair[1]; branch cloth insignia (for the left collar tab) sells for $.17 a pair[1]. Also to be sewed to each of your fatigue jackets are the "U.S. Army" tab ($.02) above the left pocket and a tape ($.05 a yard) with

[1] Quartermaster stores are not stocking these items. Prices quoted are for the Fort Benning Post Exchange. Other exchanges will charge similar prices.

your last name stencilled neatly in black, indelible ink above the right pocket. If you are handy with needle and thread you can sew all this insignia yourself; if not, the Quartermaster Clothing Repair Shop or PX-concession tailors will do it for you.

Bring some civilian clothes. They are authorized during off-duty hours. Sports attire is generally worn off duty but you should have at least one dress suit, shirt and tie for wear on occasions when casual clothing is considered too informal.

Here are a few hints for the second lieutenant who wants to look smart, yet save money.

Buy one pair each of combat and paratrooper boots: the cheaper combat boots for wear in the field, the "jump" boots for parade or inspection. A pair of Quartermaster low quarters will do for ordinary wear, but you'll want another pair of better quality, smooth calf for dressing up.

Buy belts, ties, shirts and woolen socks at the QM store—you get the same clothing at lower prices. Khakis are cheaply and easily tailored, so buy them from the QM stores, too.

Be sure to check for matching colors. The shade of tropical worsteds or Army greens sometimes varies from dealer to dealer. And speaking of colors—have your new fatigues washed and starched once or twice to fade them before wearing. This will help you to overcome that "brand new" look. Beware of shrinkage with fatigues, too.

Official Calls

As a student, you generally are not required to call on senior officers, but if you have been assigned to a unit, you will be expected to make official calls. Check with the adjutant for instructions and local policies.

Quarters or Housing

Unmarried officers, or those who do not bring dependents with them, live in bachelor officer quarters. These provide each officer with his own bedroom and study, plus bedding and a minimum of furniture. During the basic officer course at Fort Benning two officers usually share a room. A small fee is charged for washing linen and maid service.

Married officers with TDY orders may, *at their own expense*, bring their families. To find out about family housing (which for basic students will generally be off post), contact the Personal Service Division of the Adjutant General Section at your new post.

Many installation commanders send a letter indicating the off-post housing situation to incoming officers shortly after it is known that they are to arrive.

The Personal Service Division's billeting office *does not locate* or *rent* housing. It is an information agency which can provide you with the names of rental

Lt Bernard F. Agnelli, author of "The Mule Returns" (October 1956 *Quarterly*) now contributes another article. Lt Agnelli has had considerable newspaper and writing experience. He received a reserve commission upon graduation from Fordham University in 1954, completed the basic Infantry officer course at Fort Benning in October 1955 and is now assigned to Editorial and Pictorial Office, U. S. Army Infantry School.

agencies and lists of available off-post housing.

The government will ship up to 600 pounds of household goods on TDY orders. Just write the transportation officer of your assigned post—or any nearby army transportation office for the necessary forms. Send these forms and six copies of your orders to the transportation office of the Army installation nearest your home (preferably the headquarters of your army area). Depending on the distance, you should allow one to two months for your household goods to reach your assigned post.

Your Automobile

If your car is in good condition and adequately insured, bring it. A car is always a convenience in the army, both for getting around post and for off-post travel.

Because of the chance of overseas assignment, many officers prefer not to buy a car until they complete their basic course. You can usually find a fellow student who will share his car if you will share expenses. And at most Army stations, you will find laundry and complete shopping facilities right on post.

At most posts, officers must register their cars at the Provost Marshal's office within 72 hours after arrival. The owner must produce proof (generally in the form of the insurance policy itself) of a minimum coverage of $5,000 to $10,000 property damage and $5,000 personal liability. Don't forget to bring your state driver's license and certificate of registration or title.

When you drive your car on a military post, be sure to adhere strictly to all traffic regulations. These regulations are stringently enforced, and violators may lose their driving privileges.

Activities and Facilities

You can expect to become a member of the Officers Club as soon as you arrive at your new post. The membership fee for each club is different but ranges generally between $3 to $6 a month. The club usually offers golf, swimming and other social and athletic activities. Medical care will be provided for you and your dependents. Adult dependents may purchase groceries at the post commissary, and there is usually a Quartermaster laundry nearby. Unmarried officers can usually eat quite economically at a consolidated, unit or club mess—lunch and dinner should average about 80¢ each, breakfast even less. Post exchanges offer a wide variety of wares at low prices. Motion picture theaters and recreational facilities are found on every Army post, and you'll enjoy the many sports programs, whether you prefer to play or just to watch. Of course, religious services are held in post chapels by chaplains of all the major faiths. And if you require the services of the Red Cross, you will usually find a field office nearby.

How to Get Along

Here are several points of general advice you would do well to remember:

1. If you want to receive mail, send your complete mailing address home and to your friends. Also send your telephone number for use in case of an emergency at home.

2. Always keep your word and have a good reason for everything you do.

3. Never try to bluff or alibi—we all make mistakes.

4. Conduct yourself at all times in a military manner; never forget the everyday military courtesies.

5. The Army places a premium on loyalty. You should encourage it in your subordinates and give it to your commanders.

6. You can't afford to be late for anything in the Army. If possible, always try to be early if you have an appointment.

7. Officers of your own rank have the same problems and receive the same pay that you do. Try to choose most of your close friends from this group.

8. People are quick to judge others by their appearance. If you look "sharp" people will tend to have more confidence in you.

9. Never use obscenity or profanity—this will cheapen you in the eyes of others.

10. Don't tempt fate—keep valuables locked up.

11. Pay your bills on time. (Club and mess bills must be paid by the 10th of each month.)

12. Have your personal affairs in order before you leave home.

13. Save copies of important orders that pertain to you. (Bring your shot record with you to avoid having to take all of your shots again.) Start your personal 201 file as soon as you come on active duty. Keep it up to date as you receive new orders, records or other important documents.

14. If you're married, give your wife a copy of *The Army Wife*—and see that she reads it. Whether you're married or single, buy yourself a copy of *The Officer's Guide*. This perennially useful publication contains a great deal of up-to-date information for the newly commissioned officer.

15. Make use of military information available to you, and keep up to date on the latest changes and developments.

16. Memorize your Army service number (ASN). During your first few weeks on active duty there will be many occasions for you to write or recite it. You can save yourself time and trouble if you know it beforehand.

17. Besides items mentioned in various sections of this article you may want other personal gear. Depending on your own interests and inclinations you may wish to bring along sports equipment, swim trunks, books and stationery. A radio will add to your enjoyment during off-duty hours. One thing which will more than repay in usefulness for the packing space it takes up is an alarm clock. It's a good idea to have a lock or two—for footlockers and wall-lockers.

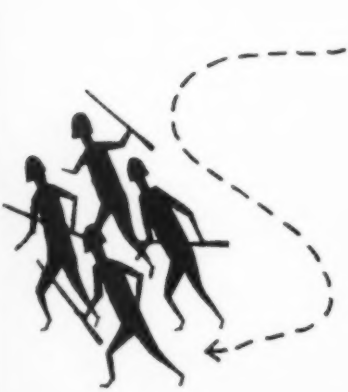
Because of his college training the ROTC graduate enjoys many advantages in the army. With these advantages goes the responsibility of reporting for duty—prepared. The answers we have provided should help the newly commissioned officer meet his first weeks in the army with poise and confidence—confidence that should make his military service successful and enjoyable.

Infantry magazine is a valuable source of information for the ROTC instructor and cadet. By keeping up with the latest changes and developments in Infantry organization, tactics and techniques the cadet will be better prepared for his active duty service.

Isolation of units and encirclement may increase in the fluid operations of modern warfare. Our units must know how to evade and escape.

EVASION &

In the April issue of Infantry M/Sgt James F. Quinn discussed evasion and escape techniques for the individual soldier. This article by Major Whiting discusses problems facing the commander and the training of units to evade and escape.—Editor.



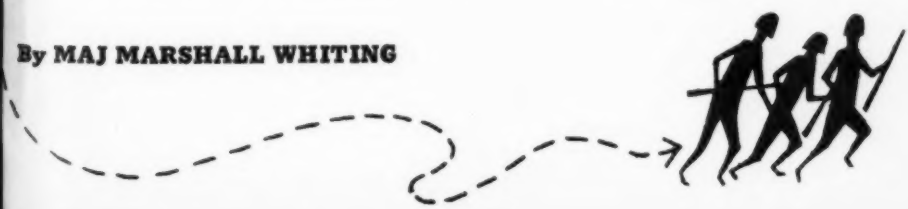
& ESCAPE · PART II

Three thousand men chopped, crawled and climbed their way through more than 150 miles of jungle, morass and mountains to attack an objective deep in enemy territory. They destroyed or otherwise disrupted 90 miles of railroad, demolished innumerable bridges, and created havoc and confusion that occupied the attentions of an entire enemy army, upon which were inflicted uncounted casualties, before returning to friendly lines.

This was accomplished by British Chindits under the colorful Brigadier Orde Charles Wingate, in Burma in 1943. His force, popularly known as Wingate's Follies, was composed of many men who would have been unacceptable for enlistment in the U.S. Army because of illiteracy, inaptitude or general physical limitations.

The outstanding success of Wingate's expedition is said to have been the result of a leader's thorough preparation of his troops to operate in tactical isolation. Also important to Wingate's success was his refusal to expend troops in an attempt to defeat a larger enemy force. Nor would he surrender his unit to a larger force when assaulted or encircled. He had organized and trained his unit to strike in force until repulsed or encircled, then to escape and evade in organized segmentary evasion groups. This ability accounted for the successful employment of his unit under extreme and isolated conditions. The enemy could at best crush,

By MAJ MARSHALL WHITING



capture or pursue *only small segments* of a force which suddenly burst into numerous organized groups and fled helter-skelter to all points of the compass toward an unknown rendezvous.

Several U.S. Army units were later organized and trained in the same techniques which Wingate used so successfully in Burma. The first and most notable of these was Merrill's Marauders. We are familiar with the fine record of these troops which operated deep in enemy territory. Repeatedly, they emerged from enemy encirclement because they were trained in evasion and escape tactics.

And during the Korean conflict, many instances were recorded where units fought on when isolated from friendly contact or support. Others escaped envelopment or avoided capture through the proper use of evasion tactics, even though they had received no special training in these tactics. In these cases, it was largely the initiative of the commander which made the difference.

Commanders who lose their units through capture or destruction usually do so because they lose control. Reports by many returned POWs indicate their leaders failed in this respect. Their unit literally fell to pieces when control was lost, and a spirit of "every man for himself" took over. As poor as these commanders were, however, many units may have survived if they had been trained in evasion and escape tactics.

Under the conditions imposed by modern warfare, encirclement and isolation of units may increase. We must prepare our troops now if we are to survive in the future. Each individual soldier in our ground forces must be trained to carry out his part in evasion and escape tactics within his unit. Prior to combat, each member of the unit should know how to use all the weapons organic to that unit. He should have confidence not only in the capability of all the weapons but also in his ability to use them. In addition, he must be economical in the use of ammunition; he must be familiar with the use of his unit's communications; with elementary first aid; woodcraft; concealment and camouflage; maintenance of direction; movement through rugged terrain; and he must have knowledge of the enemy. And these are but a small part of the soldierly skills requiring additional precombat training stress.

The same rule applies to the commander. He must be prepared to meet the increased demand for leadership ability. He must be capable of solving the problems involved in fighting under the extreme circumstances imposed by isolation or envelopment of his unit.

The competent leader will take immediate steps to maintain complete control of his unit when he first anticipates isolation or encirclement. At the first indication of this situation, his first requirement will be to alleviate excessive apprehension or allay any tendency to panic by personal and aggressive demonstrations of command. After he has made an estimate of the situation he must give it to his subordinates and then make a decision. A simple guide to aid him in deciding on a course of action should be:

1. Can my unit remain in this position and survive?
2. Can we communicate with friendly forces?
3. Can friendly forces reinforce, resupply and/or support us by helicopter, airborne action, airlifted operations, ground operations, long-range artillery or air-ground support fire missions?
4. Can I still accomplish my mission by holding this position? By other action?

Once the commander has applied these questions to analyzing his position, there are several courses of action which he may adopt.

He may decide to remain in position and continue to fight. This course of ac-

tion has proven successful in many instances and frequently has resulted in fewer KIAs, POWs and MIAs than other possible courses. Positive action on the part of the commander, from squad to major unit, is essential in this situation.

The commander may decide to organize and fight his way back to friendly forces. There are two ways in which this may be accomplished, depending on the circumstances. In case of complete encirclement, it is necessary to organize and conduct a break-out operation. When open areas can be found, it may be possible to infiltrate the entire unit out of the position and move to friendly lines, fighting as necessary, along the route. Full use should be made of reconnaissance and fire support in both measures.

Another course of action may be to break the unit into small segments and organize them into evasion groups. All groups should receive a full share of all supplies within the position. Leaders must be appointed, using all junior leaders present, and a chain of command established within each group. As far as possible, separate routes or evasion areas should be designated in order to gain dispersion.

The commander may decide to move his unit deeper into enemy territory, establish a base camp and conduct guerilla operations. This course of action calls for special knowledge of the area to be penetrated, including friendly and unfriendly natives, enemy installations and actions, likely targets, supplies and the condition and capabilities of the unit. This action in no way infringes on the mission of guerilla warfare units. No attempt should be made to destroy items which may be of value to a counterattack force. Targets should be limited to enemy supply centers, CPs and similar field installations.

The adoption of any of these measures may be made in any sequence at the dis-

cretion of the commander. He may first choose to defend, then to effect either a breakout or a move deeper into enemy territory and finally to break his unit into small evasion groups. Several factors will influence the sequence of action. Among the most important of these are: the status of supply; communications; physical condition and esprit of the troops; location, strength and activity of the enemy; terrain and distance to friendly forces; and the support, if any, obtainable from adjacent units.

All of these actions require strong, aggressive leadership, and are presented in detail in DA pamphlet 355-6, Officers Call, "Command and the Code—Never Surrender," dated July 1956.

Present tactical training equips Infantry units with the ability to execute the first two courses of action. Training requirements which will enable troops to accomplish the third, will be found in the current Army training directive, Training Circular 621-1, "Evasion and Escape Training," 25 February 1955. This directive establishes a three-phase training program composed of two 1-hour lecture periods to be presented in continental United States, and a field training phase conducted in the overseas area to which the individual is assigned.

The first lecture period is given during basic training. DA pamphlet 21-46, "Behind Enemy Lines," is used as instructional material. The second lecture is presented by an Army-trained briefer, at the time an individual or unit is ordered to an overseas station.

It is not necessary to wait until a unit has reached its overseas area of operations to conduct effective evasion exercises. There is a great deal to be gained by conducting this training early in a man's career. More is to be gained by completing the combat effectiveness of the unit itself, prior to overseas movement, with capabilities in these tactics. Training

Figu

schedules notwithstanding, the good leader will find time to fit all, or part, of evasion and escape tactics into his training schedule.

All military training within Infantry battle groups *contributes* to successful evasion and escape ability. However, additional techniques must be learned. These include: the construction of shelter, how to live off the land, evasion geography, enemy interrogation and indoctrination techniques, POW camp organization, escape devices and methods of contacting friendly forces. These subjects are included in the third phase of evasion and escape training.

Leaders are assisted in this training by the "Code of Conduct" outlined in

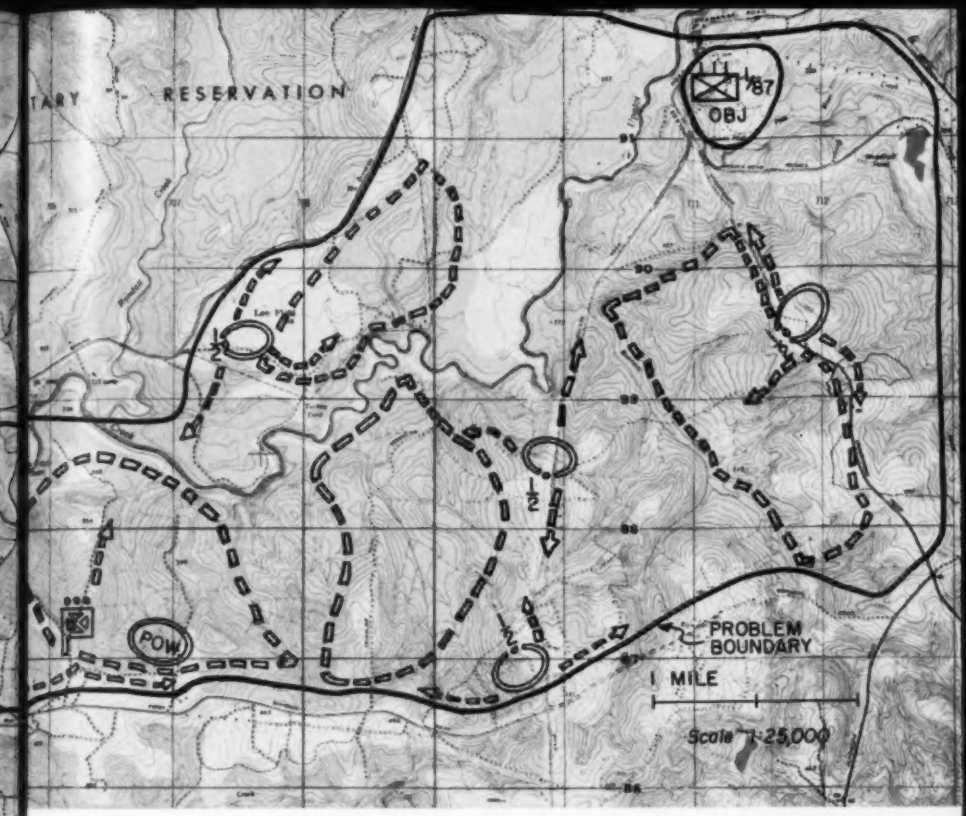


Figure 1. A typical area for evasion and escape training.

Training Circular 21-1, 7 October 1955. The "Code of Conduct" delineates, in simple, everyday language, a basic code for all soldiers.

Additional, and more positive, instructions for evasion and escape training are contained in Training Circular 21-2, "Training for Individual Combat Effectiveness," 3 November 1955. This directive requires all units to integrate evasion and escape training into as many unit exercises as practicable. Small evasion groups should be inserted into problems and required to infiltrate through the unit being trained. An objective should be given to these groups. Activities of this nature offer many training bonuses.

More thorough training will result from a unit exercise specifically designed for evasion and escape instruction. Such an exercise calls for special planning. Without a logical starting point, plan, route, logistical support, communications, chain of command, and an objective, the training program will have minimum value.

Using Figure 1 as a guide, we will examine some of the characteristics of this type of training exercise.

For the conduct of evasion and escape training a large rugged, unfamiliar piece of terrain is required. A minimum area for a 12-24 hour exercise is approximately three miles in width by ten miles in length. Clearly defined boundaries on both flanks of the objective are an advan-

tage; roads, rivers and mountains make excellent natural boundaries.

A good road net throughout the area will facilitate control and movement of the aggressor forces, and act as natural guiding features for the evaders. If water and edible wild plants are present in the area, some of the basic survival techniques may also be taught. If there are any dangerous terrain hazards in the area, trainees should be informed of their presence.

The size, equipment and employment of aggressor forces will depend on the size of the training area and the availability of troops for the aggressor role. Special effort should be made to motorize the aggressor forces so they may be moved about quickly to critical areas throughout the problem area. Activities should include ambushes along easy and obvious routes for evasion, and dismounted and motorized patrols.

A good long-range radio network will facilitate control and movements of the aggressor forces and will provide an additional over-all safety factor. Actions of the aggressors should be closely observed and umpired, especially their capturing and handling of trainees in a prisoner of war status. TC 21-2 is explicit in the manner in which these activities are to be conducted.

It is advisable to use Army interrogators in conjunction with the aggressor forces to conduct interrogations and check on the security consciousness of each individual captured. Simple ruses and tricks should be employed to test the trainees' alertness. Opportunities for escape between the point of capture and prisoner of war collection points should be created to develop the "escape" facet of the exercise. These staged or assisted escapes should not be made too easy or they will create false impressions concerning the enemy's laxness or the individual's ability to recognize and take advantage of an escape opportunity. Common sense and realism should be the guide for all aggressor activities.

A simple, easily understood control plan supported by an adequate communications net is essential to a safe and smooth running exercise. The rules of the exercise should be as few as possible. It is highly recommended that the umpires and key aggressor personnel attend the initial orientation of the unit being trained. Those items relative to safety, boundaries, capturing procedures and umpiring should be explained and all questions relative to these items answered in their presence. This system will start everyone out with a common understanding. Members of the training unit will know who the umpires are, their uniform and authority.

Safety areas or ambulance points should be established throughout the area and all persons taking part in the exercise should know them. Clearly defined actions in case of accident should be established in order to get medical aid and evacuation to any injured individual as

soon as possible. Helicopter evacuation should be utilized if available.

During the orientation, a simple tactical situation should be developed. Upon reaching the objective, an officer or NCO should debrief each group or person as they report in. This debriefing should be similar to a patrol debriefing should first be concerned with items of immediate tactical value. Critiques may be conducted for each group as they reach the objective or for the entire unit upon completion of the exercise.

A well-conducted evasion exercise will provide a good yardstick with which to measure individual proficiency and unit combat readiness.

Knowledge of evasion and escape techniques will help to develop self-reliance, a strong sense of duty, and a determination to fight the enemy at all times with every means available.

With its related fields of survival training and Code of Conduct indoctrination, this instruction can be interesting, challenging, and profitable. It is one of the most important leadership responsibilities in our present-day army.

MAJ MARSHALL WHITING has been associated with Army intelligence for the past 15 years. Enlisting in 1941, he was a scout, I&R platoon sergeant and an intelligence sergeant before receiving an OC commission a year later. During World War II, he was an I&R platoon leader with the 25th Division in the South Pacific, later becoming a company commander, battalion S2, S3, and finally a regimental S3. After completing an intelligence course at the Army General School, Major Whiting went to Korea as assistant G2, 24th Division. Returning to this country, he was graduated from the associate advanced course at The Infantry School and in 1954 began his present assignment as an instructor in the Staff Department.

TRAINFIRE I ADOPTED

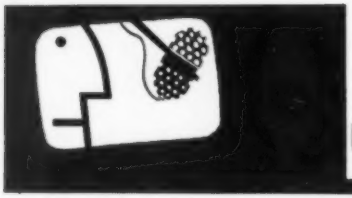
The U.S. Continental Army Command has announced that the Trainfire I method of rifle markmanship instruction has been adopted and will be implemented Army-wide for all rifle markmanship training.

Information on the Trainfire I program has been published in earlier issues of *Infantry*. Details concerning the new method of instruction, the electronic pop-up target, "Punchy Pete," and illustrations of ranges, targets, etc., may be found in two articles, "Trainfire," January 1956, and "More About Trainfire I," April 1957.

Basically, Trainfire I shifts the emphasis in rifle markmanship from the weapon to the man without changing the primary goal: to hit the target. It teaches rifle shooting to trainees under conditions that simulate combat as closely as safety factors permit.

Active Army installations within continental United States will be the first to build Trainfire I ranges with priority going to Army training centers and the U.S. Army Infantry School at Fort Benning.

Contracts for the construction of Trainfire I ranges have already been awarded at Fort Jackson, S.C. It is expected that by 1959 implementation will be complete within continental United States. By 1960 all overseas commands should have Trainfire I ranges and Reserve Forces should have these facilities by 1961.



UARTERLY QUIZ

Answer the following questions to determine whether you are a bolo, recruit, marksman, sharpshooter or expert. Each question is worth 10 points.

1. Under conditions of atomic warfare the forward battle groups of the division in the mobile defense will normally be deployed in:
   a. A perimeter-type defense.
   b. A form of the position defense.
   c. A mobile-type defense within the battle group, holding the forward edge of the battle position with minimum forces and holding the greater portion of the battle group as a mobile striking force.

2. Atomic warfare places a high premium on dispersion, mobility, communications, morale and leadership. In visualizing what dispersion will be acceptable between units, which of the criteria below is the determining factor?
   a. Specific radii of effects of specified size enemy atomic weapons.
   b. Any formation of two or more company-size units concentrated in a particular area provides a suitable atomic target.
   c. Accept the maximum dispersion that is consistent with the performance of the mission.

3. What are the three principal phases of instruction in the Trainfire I rifle marksmanship course?

4. What is the primary method of fire adjustment with the 76mm gun tank?

5. Is aerial delivery considered only as an emergency means of resupply?

6. What capability for maintenance exists within the battle group?

7. How is maintenance provided for elements of a truck transport company attached to a battle group for an extended period?

8. Communication between the pentomic division headquarters and the five battle groups is established by:
   a. *Direct* radio and wire communication from the division headquarters to the battle groups provided by the division.
   b. Support platoons from the division signal battalion which operate an area signal communication network in the vicinity of the battle groups and provide the communications link between the battle groups and the division headquarters.
   c. The battle groups, by utilizing radio and wire equipment specifically issued for this purpose.

9. Direct lateral radio communication between adjacent battle group commanders is established by:
   a. No particular rule as both comanders are in the division commanding general/command net.
   b. Specific radios issued for this purpose which are mounted in the commander's vehicle.
   c. The calling commander entering the unit FM net of the called commander.

10. What courses of action are open to a commander of an isolated unit?

(For answers turn to page 100)

GROUND NAVIGATION

The average footsoldier does not know enough about land navigation. He finds it difficult, if not impossible, to find his way from one predetermined point to another. In the widely dispersed, mobile operations of modern warfare, this weakness becomes increasingly serious. It is a weakness we must correct.

Since we spend considerable time on map reading instruction, and since our instruction is generally conceded to be good, it would seem that this shortcoming lies with the individual. However, this is not entirely true. The weakness stems, primarily, from the lack of logical transition from the academic phases of map reading instruction to the proper use of the map in the field.

By Capt Glen D. Belnap and Capt Hampton Rowland, Jr.

When the soldier is thoroughly familiar with the basic phases of map reading—topographic and military symbols, grid coordinates, scale, distance and direction—he is well on his way to becoming a map reader. At present he is taught how to orient his map with the ground, told to determine his individual pace factor for measuring distance on foot and instructed in the use of the compass in land navigation. He then is examined in map reading. If he can successfully negotiate a multi-legged compass course and if he can find his location in an area which probably abounds with manmade features, he is considered proficient. At this point the soldier's instruction in map reading generally ends. He must take the next step—practical application of the knowledge he has acquired—on his own.

This is where we let him down. We expect him to know how to orient his map with the ground, to find his location in the field and to move from one point to another with only natural ground forms on which to guide. Most soldiers cannot do this. We must provide a better transition between formal instruction and land navigation in combat—we must bridge this current wasteland in the development of proficient map readers.

Given considerable time for additional instruction and practical experience on varied terrain, there is no doubt that we could fill this gap. However, there are many demands on the soldier's training time. Our transition training must be simple and easy to accomplish, yet effective. It can be reduced to insuring that the soldier:

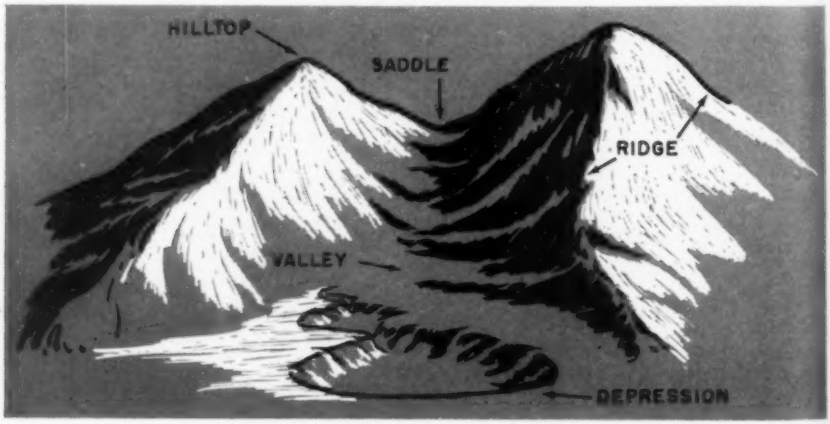
1. Understands the relationship between the contour lines on his map and the ground forms they represent.

2. Knows how to use ground forms to get from one place to another.

Although current training literature adequately defines contour lines and their characteristics in some detail, the average student finds this information difficult to absorb. The deeper the instructor goes into the subject of contour lines, the more confused the student usually becomes as to the significance of these "brown curlicues" and their characteristics. He needs a simple set of terms and principles of terrain association to apply to the interpretation of these lines on a map.

Further confusion is created in the student's mind by the additional requirement that he absorb into his vocabulary the many terms normally used to describe terrain features. Many of these words

Figure 1. Terrain features.



refer to similar, if not exactly the same, features. In addition, there may exist local or sectional names for ground forms which are called something else in other localities.

The problem of terminology becomes readily apparent when a number of persons are asked how they would refer to a valley. Answers, in addition to valley, may be: draw, arroyo, dell, glen, dale or hollow. If the valley contains a stream we might hear creek, branch, stream or river. Furthermore, some terms lead to a variety of interpretations. To the soldier from the Northwest, a mountain is extremely high, heavily wooded and ends in a snow-covered peak above the treeline. To the Southwesterner, a mountain is a towering, barren, craggy mass. On the other hand, most Easterners visualize mountains as lower and entirely covered by trees.

To reduce descriptive verbiage to a minimum and to eliminate this unnecessary mental burden, the multiplicity of terms currently used to describe ground forms should be reduced. Without oversimplification, all terrain features can be classified as *hilltops, valleys, ridges, saddles* and *depressions* (Figure 1).

A standard set of terms for ground forms not only describes the patterns formed by contour lines, but also makes it easier for the soldier to use and remember them. For example, a hilltop is indicated on a map by the last closed contour; a valley, by the base of the Us or Vs formed by the contour lines pointing to high ground; a ridge, by the base of the Us or Vs pointing to low ground; a saddle, by hourglass or figure-eight-shaped contours; and a depression, by a closed depression contour line. To assure complete understanding, the soldier should be required to associate these five terrain features as described on the map with the same terrain features as they appear on the ground (Figure 2).

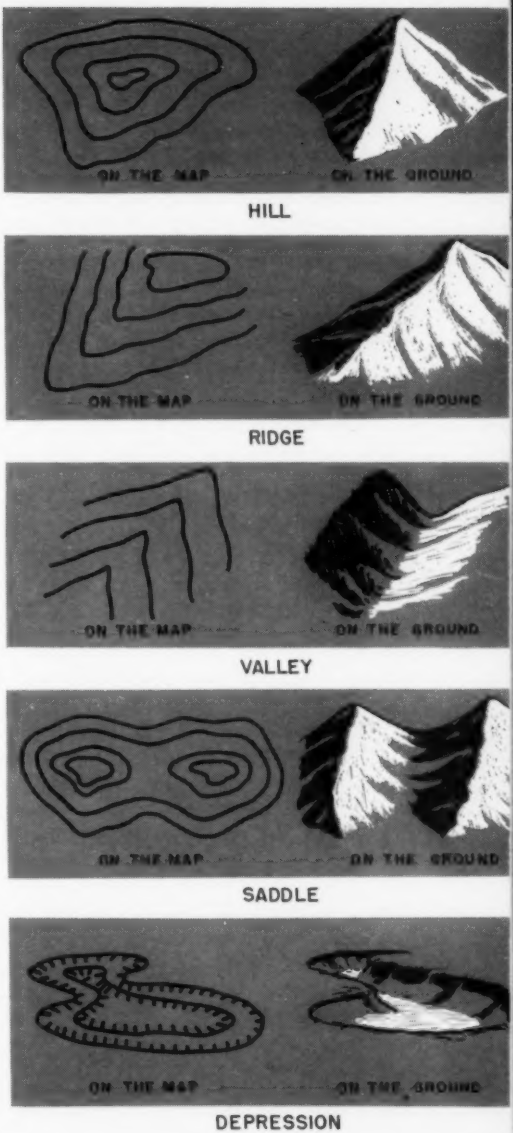


Figure 2.

The student should be taken over varied terrain where these ground forms can be pointed out and where he can learn

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CAPT HAMPTON ROWLAND, JR. began his military career as an enlisted man in 1942. Upon completion of the OCS course three years later he served in various company-level command assignments at Fort McClellan, Fort Campbell and in Germany. Capt Rowland then became PMS&T at Polytechnic High School, Long Beach, California, and in 1952 served with the 5th RCT in Korea as a company commander, battalion S3 and RCT S3. After completing the Infantry officer advanced course, Capt Rowland was assigned to the United States Army Infantry School as an instructor on the Map Reading Committee of the Staff Department.

to identify them. He must then be taught how to compare and associate these terrain features with the patterns formed by contour lines on the map. Once he understands the terms and the relationship between what is on the ground and what is on the map, the mystery surrounding contour lines vanishes forever. No longer are the characteristics of contour lines merely a list of words in the field manual. They become a useful part of his military knowledge. Upon this firm foundation the soldier can readily master the few remaining significant principles which he must know about contour lines.

He is then prepared to use his knowledge of terrain and its association with the map to assist him in moving from one location to another.

Navigating on land is not new. In fact, it was done successfully long before accurate maps were drawn. A great many methods have been and still are used.

In FM 21-26, March 1956, two methods of land navigation are described. One of these methods is known as "dead reckoning" and is defined as "the process by which position at any instant is found by applying to the last determined position the direction and distance of the course, or courses, traveled." Such a procedure is best applied, and often mandatory, in densely wooded areas, during hours of poor visibility or in any area void of terrain features, such as swamps, deserts and some parts of the polar regions. Dead reckoning depends primarily on movement by compass azimuth for a known distance with little or no regard for terrain features along the route except to use them as sign posts. Such a procedure requires almost complete dependence upon the compass and measurement of distance, either by instrument or by pacing. Dead reckoning has its place, but certainly not in any area of the world where prominent terrain features exist and can be seen.

The second method of navigation is the one normally used by land troops and one in which every soldier should be proficient. Briefly, this method involves movement from one given point to another, utilizing the compass and/or man-made and natural features as reference points to assure accurate direction. A straight line is often followed in this method, but it is also possible to use an indirect route in moving to a given destination. The theory underlying this most common type of land navigation is sound. However, most soldiers frequently fail to use this technique of movement successfully because they have not received proper training. It is fairly easy for an

instructor to *tell* a student to orient his map with manmade or prominent terrain features, and to use those features to guide upon in movement over terrain. Yet, as we have discussed, it is almost impossible for the student to perform such a feat without full knowledge of correct procedures and techniques. Of course, it is recognized that, given time and enough experience with the use of maps in the field, he will probably develop the ability on his own. Some men have what is called "a good sense of direction." This is little more than an unconscious development of this ability. Often those who have it are not able to explain this "natural" skill when asked, and are regarded in complete awe by their "not-so-gifted" comrades.

What is needed is a foolproof method of land navigation which will meet the needs of modern warfare. A system which will include not only the use of direction-finding instruments but a detailed knowledge of map and ground features. Such a system of navigation should appropriately be given a distinctive name. We suggest the name *ground navigation* since this type of navigation is basically dependent upon the knowledge of, and use of, ground forms. It depends on the compass and other direction-finding instruments to the absolute minimum. *Ground navigation* is most effective when prominent ground forms exist and can be seen. Under conditions of reduced visibility and in the absence of prominent ground features a combination of methods must be used.

Ground navigation requires that a soldier have his map oriented to the ground and that he begin from a known location. Assuming that he has a final destination marked on his map, he is ready to start. The first step is to *determine the general direction* to his destination. With his map oriented he needs only to extend a visual line of sight from his map location to the plotted destination. Then raising his eyes out over the terrain in the same general direction, he gets an indication of his course and the intervening ground. It must be emphasized that he will not proceed in this direction on a compass azimuth as he would in dead reckoning or in straight-line land navigation.

The second step is to *study the terrain* on the map between his present location and his future destination. He looks for prominent ground forms upon which he can guide. He then selects the route that provides the easiest movement and which is tactically the most secure. Frequently, this will not be the most direct or shortest route, but it will assure his arrival at the correct destination. Applying his previously acquired knowledge of contour lines he readily recognizes the hilltops, valleys, ridges and saddles on his map and on the ground. He can now plot an accurate route to his destination and reach it by guiding on the predetermined ground forms identified on the map.

The third step is to *determine or measure distance* from the map. Then, as he moves, using his graphic scale and pace factor, he can at frequent intervals determine the distance from one prominent terrain feature to another, especially at changes in direction.

The fourth step, also based on a thorough knowledge of contour lines, involves the *changes in elevation* along the route. The soldier must compute and take into consideration differences in elevation between terrain features.

The final step involves *confirmation* of his location at points all along the chosen route as well as at his ultimate destination. This is done by comparing on the map and the ground not only the terrain feature on which he is located but, also, all surrounding terrain features, using direction, ground forms, distance and elevation.

To the experienced map user this technique of land navigation is not new. He utilizes these principles without conscious effort. However, he does not rely entirely on any one method of navigation. He uses dead reckoning, simple forms of celestial navigation and the various techniques of ground navigation in any combination, depending upon the circumstances.

Our instruction in map reading must make proper methods of land navigation habitual. With a little additional effort we can bridge the present wasteland between formal instruction and practical application. When all Infantrymen *know* the techniques of ground navigation, our leaders and our units will be able to navigate successfully on the battlefield.

PARENTS SHARE OUR SENTIMENTS

As Infantrymen, we are naturally proud of the Army, the Infantry and our Infantry School. But it is gratifying to know that parents of Infantrymen share our sentiments. So that all may be aware of and encourage further development of this splendid mutual feeling I wish to pass on to you the following excerpts from several of the many letters I constantly receive from parents of Infantrymen:

"I was deeply impressed, on my first visit to any Army base, with the attractive buildings, the immensity and the all-over immaculate appearance of Fort Benning.... We pray that (our son), ever mindful of the opportunity that exists for all in this wonderful country of ours, may so conduct himself in his personal affairs and in the discharge of his duties as to continue to merit the favorable notice of his superiors...."

"We wish to thank you for the fine letter you wrote to us concerning our son.... (He) and his sister... our only children... were very close. (He) was in his last year in college and (our daughter) was in her first year when she suddenly passed away. The shock was terrible but our boy went on to graduate high in his class. The army gave him his commission and a year's leave of absence to get his Masters Degree. Then he reported to you for duty at Fort Benning. ... We are proud of our country and proud of our son."

"I am sure that (our son) has had excellent training and from the experience that I had in the Army in World War II, I feel sure that training of this kind certainly is of great value to any man in the Army. It certainly should enable him to do much better work in the future and I trust that his services will be of value to the Army."

HERBERT B. POWELL
Major General, U.S. Army
Commandant

CHECKLISTS for Infantry leaders

This is the sixth in the U.S. Army Infantry School series of checklists for small-unit leaders. We repeat our word of caution on checklists. They are not inflexible rules but guides that should be modified to fit the situation. Use them to check your thinking and free your mind for other considerations.—Editor.

Troop Leading Steps

1. Begin planning—
   a. Plan the use of available time.
   b. Begin the estimate by—
      (1) Using a map, sketch, or aerial photograph to analyze the terrain for—
         (a) Critical terrain features.
         (b) Observation and fields of fire.
         (c) Cover and concealment.
         (d) Obstacles.
         (e) Avenues of approach.
      (2) Analyzing enemy strength, locations, dispositions and capabilities.
   c. Make preliminary plan.
   d. Announce planning guidance to subordinates.
2. Arrange for—
   a. Movement of unit—
      (1) Who will command?
      (2) Where, when and how will the unit be moved?
   b. Reconnaissance—
      (1) Select route, schedule, persons to take along.
      (2) Decide how subordinates will be used.
   c. Issuance of order (notify subordinate leaders of time and place).
   d. Coordination (adjacent and supporting unit).
3. Make reconnaissance by—
   a. Examining the ground.
   b. Changing the preliminary plan, if necessary.

4. Complete plan—
   a. Receive recommendations.
   b. Complete estimate.
   c. Effect coordination.
   d. Change preliminary plan as needed.
   e. Prepare order.
5. Issue order (include orientation on terrain, if possible).
6. Supervise (energetic, intelligent inspection is needed to be certain that the order is properly executed).

Patrol Leader

After receiving commander's briefing the patrol leader—

1. Makes a tentative plan including—
   a. Use of time to accomplish—
      (1) Warning order.
      (2) Reconnaissance.
      (3) Detailed plans to accomplish mission.
      (4) Issuing patrol order.
      (5) Rehearsals.
   b. Personnel to accompany him on the patrol.
   c. Weapons and equipment required to accomplish the mission.
2. Issues a warning order including—
   a. A check of the physical condition of men accompanying him on the patrol.
   b. A statement of mission.
   c. Arms, ammunition and special equipment required.
   d. Uniform, including camouflage measures for men and equipment.
   e. Ration requirements.
   f. Time and place for issuing the patrol order.
   g. Chain of command.
3. Makes reconnaissance (map, ground, air) to include—
   a. Selection of a specific route.
   b. Selection of an alternate route of return.
   c. Plotting of danger areas.
   d. General familiarity with terrain.
4. Orients the patrol members on a map or on the ground and issues his order, including—
   a. General situation—
      (1) Information of the enemy (location, activity, strength and terrain).
      (2) Information of our own troops (location, mission of higher unit, fire support available for the patrol, and mission and routes of other patrols).
      (3) Attachments and detachments.
   b. Mission—what the patrol is going to accomplish.
   c. Execution—
      (1) General plan.
      (2) Specific duties of each individual or unit.
      (3) Coordinating instructions—
         (a) Time of departure and return.
         (b) Route to be followed.
         (c) Alternate route of return.
         (d) Actions at danger areas.
         (e) Initial formation.
         (f) Actions upon enemy contact.
         (g) Initial rallying point.
         (h) Actions at rallying points.
         (i) Actions at objective.
         (j) Reporting results of patrol (when and to whom).
   d. Administrative matters—
      (1) Arms.
      (2) Ammunition.
      (3) Special equipment (state which members will use this equipment).
      (4) Uniform (to include camouflage measures for men and equipment).
      (5) Rations.
      (6) Method of handling wounded.
      (7) Method of handling prisoners.
   e. Command and signal matters—
      (1) Signals to be used for control within the patrol.
      (2) Communication channels to be used including—
         (a) Call sign.
         (b) Method of reporting patrol's progress.
         (c) Special codes.

(3) Challenge and password.
(4) Chain of command.
(5) Location of the patrol leader in the formation.

5. Conducts dress rehearsal to include—
a. Actions upon enemy contact.
b. Actions at danger areas.
c. Actions at objective.
d. Formations.

6. Prior to departure—
a. Conducts test firing of all weapons.
b. Inspects men and equipment for—
(1) Camouflage.
(2) Presence of ID tags and Geneva Convention cards.
(3) Presence of qualified specialists (if required).
(4) Serviceability.
(5) Undesirable noise.
(6) Operative communication.
(7) Completeness.

Adjustment of Artillery Fire

1. Before sending a fire mission, determine—
a. Location of the target, by using one of the following methods—
(1) Grid coordinates.
(2) Shift (right, left, add, drop) from a registration point, reference point, check point, numbered concentration, or any point known by observer and FDC.
(3) Polar coordinates by reporting the direction and distance from yourself to the target. FDC must know observer location.
(4) "Marking volley" method—
(a) Mark registration point.
(b) Mark check point number.
(c) Mark center of sector.
b. Azimuth from yourself to the target—
(1) By compass.
(2) Measurement from a map.
(3) Measurement from point whose azimuth is known—
(a) If shifting from known point to left of a reference point, subtract the angle from the reference point azimuth.
(b) If shifting from known point to right of a reference point, add the angle to the reference point azimuth.
c. Distance to the target in yards (observer-target range).

2. To request fire—
a. Establish communication with the FDC through the forward observer or company commander.
b. Send the following information—
(1) Identification of the observer.
(2) Warning order.
(3) Reference point or coordinates.
(4) Azimuth.
(5) Location of target.
(6) Nature of target.
(7) Control.

3. Use the following form to compile fire request—
a. IDENTIFICATION_____.
b. FIRE MISSION
c. FROM_____ or COORDINATES_____.
d. AZIMUTH_____.
e. LEFT/RIGHT_____ ADD/DROP_____.
f. TARGET_____.
g. WILL ADJUST (FIRE FOR EFFECT)[1]

4. During the adjustment—
a. Base corrections on an imaginary line between yourself and the target (OT line).
b. Send corrections to the FDC in the following order—
(1) Shift the burst onto the OT line by sending a correction in yards right or left (shift computed or estimated).
(2) Request range changes, in even hundreds of yards, to bracket the target. Split successive brackets until a range change of 50 yards is made.
c. Call for "fire for effect."

[1] If the location of the target is accurate (within 50 yards) and the fire requested is expected to be effective without any adjustment, the phrase FIRE FOR EFFECT instead of WILL ADJUST is used.

ANSWERS TO QUARTERLY QUIZ (*See page 90*)

Possible score 100 points, expert 90-100, sharpshooter 70-80, marksman 50-60, recruit 30-40 and hole 0-20. For detailed discussion of the answers check the references listed.

1. **b.** A form of the position defense. The battle group rarely, if ever, fights the mobile defense on its own, regardless of the type of defense being conducted by division. It participates in the mobile defense as part of the forward defensive forces or as part of the striking force. In view of this, the battle group ordinarily fights some variation of the position defense. (Chap. 7, Sec. IV, Par. 180b, USAIS TT 7-40-2, March 1957.)

2. **c.** Accept the maximum dispersion that is consistent with the performance of the mission. Among other considerations, atomic warfare places a high premium on dispersion. As a criterion, commanders should not use arbitrary figures or the radii of effects of a weapon of a specific size to determine the degree of dispersion. Every echelon of command should consider the following factors in determining within the criterion the degree that can be accepted: mission, terrain, availability of friendly atomic support, enemy air and atomic capabilities, relative mobility of the opposing forces, friendly communications, weather, nonatomic fire support, friendly air defensive capabilities and the comparative reconnaissance capabilities of enemy and friendly forces. (Chap. 5, Par. 91c(1), USAIS TT 7-40-2, March 1957.)

3. The three principal phases of instruction in the Trainfire I rifle marksmanship course are preparatory marksmanship training and 1000-inch firing, field firing, and target detection. The objective of the course is to provide the soldier with the training necessary to permit him to use his rifle effectively in combat. It is based on the fudamental principle that the combat rifleman's targets consist of enemy personnel and that his effectiveness as a rifleman depends upon his ability to neutralize individual targets. To achieve this effectiveness, the rifleman must be skilled in detecting targets, aiming his rifle at detected targets and firing upon these targets without disarranging his aim. (Chap. 2, Par. 3, Instructors Guide for Trainfire I, United States Army Infantry School, November 1956, and *Infantry*, April 1957.)

4. The primary method of adjustment is the burst-on-target, in which the gunner, observing through his direct-fire sight, notes the point on the sight reticle where the burst or tracer appears in relation to the target and, without command from the tank commander, moves that point of the gun-laying reticle onto the center of the target before firing the next round. (Chap. 5, Par. 102, FM 17-80.)

5. **No.** Aerial delivery is no longer considered only as an emergency measure of resupply, but now augments normal supply routes. Improvements in techniques of delivery and increased load-carrying capacity of cargo aircraft have increased the capability of aerial delivery. Supply by air is characterized by freedom of movement over terrain which is inaccessible or impassable to normal means of transportation, or through which normal movement is denied by enemy activity. (Chap. 1, Sec. I, Par. 1, United States Army Infantry School instructional material, "Aerial Delivery Techniques.")

6. The battle group is capable of performing second echelon maintenance on all organic vehicles. For flexibility and efficiency, maintenance throughout the Army is based upon organizing repairs into categories and echelons. The categories are organizational maintenance, field maintenance and depot maintenance. The echelons of maintenance run from first echelon through fifth echelon. Within the Infantry battle group, organizational maintenance normally includes first and second echelon work. Second echelon maintenance is that degree of maintenance performed by specially trained personnel provided for that purpose in the using organization. (Part II, Chap. 1, Sec. III, Pars. 171, 172b, c(2), USAIS TT 7-21-2, January 1956.)

7. When a truck or carrier company is attached to or placed in support of an element of the division or is at such a distance as to make maintenance support impractical from a central location, maintenance support may be provided by one of the following methods: attachment of a truck or carrier maintenance section to the company, provision for maintenance contact teams from the transportation battalion maintenance platoon to visit the units and service the vehicle in position, or coordination with the attached or supported element of the division or the supporting ordnance unit to provide all or a part of the maintenance support required. (Chap. 2, Sec. IX, Par. 37c, USAIS TT 55-37-2, Feb. 1957.)

8. **b.** The major communication support furnished by the division signal battalion is accomplished by direct support from the signal center platoon with each battle group, and by signal installations at the division advance signal center, division main signal center, brigade headquarters and division trains headquarters signal center. Each of these centers is equipped to provide a portion of the division radio, local wire, radio relay, radio wire integration and message center service. In addition, a small signal platoon, capable of providing wire, message center and limited radio facilities, is assigned to the division administration center located in the division rear command post. (Chap. 4, Sec. VII, Par. 68b, USAIS TT 7-100-2, March 1957.)

9. **c.** The division commanding general/command net is intended primarily for radio communication between the division commander and staff and the commanders of all major subordinate units. While specific employment of the net is governed by the division commander's desires, it is usually limited to vertical communications only. Under such circumstances, lateral radio communications between subordinate unit commanders are established by the calling commander entering the unit FM net of the called commander. (Chap. 4, Sec. VII, Par. 69d(1), USAIS TT 7-100-2, Mar. 1957.)

10. (1) Continue to defend on position. This decision should be based on many factors including the probability of relief by friendly forces and the possibility of holding off the enemy and eventually forcing him to withdraw. (2) Break out to friendly territory. (3) Avoid capture using evasion and escape techniques. The term, as used here, is action by an individual or a small group to avoid capture and to return to friendly territory. (4) The most aggressive course of action is for the isolated unit to penetrate deeper into enemy territory while conducting guerilla-type operations. (5) A combination of the alternatives discussed in (1) through (4). In some situations one technique by itself may not be enough to avoid capture. Combining several alternatives may thus provide the best means of remaining free and operational. (pp 4-9, Department of the Army Pamphlet No. 355-6, July 1956.)

LETTERS *(continued from page 5)*

this publication must be financed entirely by the sale of subscriptions (we are not permitted to carry advertising) this is not possible—at least not now. The number of issues might be increased by reducing the number of pages or by increasing the subscription rate or both. None of these is desirable. If the number of subscribers could be increased—substantially—extra issues might be possible. Efforts are being made to develop a wider circulation, and it is hoped that this will provide sufficient revenue to permit more frequent issues to be published.—Editor.

Mortar Training Device

Sir:

In your publication of April 1957, you have an article by Master Sergeant Charles L. Bryant concerning the . . . indoor training of personnel in the use of mortars. As company commander of a Reserve heavy mortar company, I am very much interested in training personnel through the technique described in your publication.

I would appreciate it very much if you can supply me with specifications for a similar device for the 4.2" mortar and a firing table for the 4.2 using the Bryant Mortar Training Device. Any information you can supply me in this matter will be greatly appreciated.

Willys H. Taylor, Jr.
1st Lt, Inf, USAR
Clemson, S. C.

Your letter was referred to the mortar committee, Weapons Department, United States Army Infantry School. Here is the committee's reply in part:

". . . It is felt that the Bryant Training Device can be used to equal advantage in the training of 4.2" mortar personnel as well as 81mm mortar personnel. By disregarding the principle of constant elevation normally used in the 4.2" mortar battery, and having the gunner manipulate the sight for elevation as well as for deflection, the accompanying firing table can be used. For the clamping collar of the device to be adapted to the 4.2" mortar, a wooden plug with a re-

FIRING TABLE
BRYANT MORTAR TRAINING DEVICE
4.2 INCH MORTAR

Range	Elevation	Range	Elevation
1500	1373	2625	1015
1525	1361	2650	1007
1550	1352	2675	998
1575	1343	2700	991
1600	1335	2725	982
1625	1329	2750	974
1650	1323	2775	968
1675	1315	2800	960
1700	1307	2825	953
1725	1298	2850	945
1750	1290	2875	939
1775	1283	2900	931
1800	1274	2925	923
1825	1268	2950	916
1850	1259	2975	908
1875	1251	3000	899
1900	1243	3025	892
1925	1234	3050	885
1950	1229	3075	879
1975	1221	3100	871
2000	1215	3125	864
2025	1206	3150	858
2050	1196	3175	851
2075	1189	3200	844
2100	1175	3225	832
2125	1163	3250	827
2150	1156	3275	821
2175	1149	3300	816
2200	1142	3325	811
2225	1136	3350	805
2250	1129	3375	796
2275	1121	3400	789
2300	1114	3425	782
2325	1108	3450	776
2350	1099	3475	770
2375	1092	3500	761
2400	1085	3525	754
2425	1077	3550	748
2450	1071	3575	743
2475	1062	3600	737
2500	1053	3625	730
2525	1045	3650	721
2550	1039	3675	717
2575	1031	3700	711
2600	1023		

ducer can be fabricated at little or no cost. The plug with the training device attached could then be placed in the muzzle of the mortar making sure that the mirror frame is held parallel to the impact area of the floor. Wrapping the plug with masking tape is an excellent method of keeping it from rotating in the tube. The flashlight must be moved and it can be secured to any convenient place along the extension rod by tape. With the device attached, the instructions as set forth in the author's article ("Mortars and Mirrors" by M/Sgt Charles L. Bryant, Infantry, *April 1957) may be followed to place the mortar in action. The limits of the range or impact area can be marked off with the mortar at its minimum and maximum elevations. With the flashlight on, connect the two chalk-marked limits by a ruler or tape. Mark off each three inches and indicate its range value. Remember that an arbitrary scale of 6 inches equaling 100 yards was established. Smaller graduations on the range scale may be indicated if desired, i.e., 3 inches equals 50 yards, etc. The firing table can be modified to indicate the proper heavy mortar charge to be used for the range used [see firing table]."—Editor.*

Suggestions Offered

Sir:

Your "Quarterly" crosses my desk in routine circulation, and I find it most interesting and informative. Two items in the January 1957 issue have touched on matters which have deeply concerned me for a long time, and about which I have some strong feelings which are at variance with current Army thinking.

The first of these is the article about the driver-training course which has been worked out at the school ["Misguided Missile," page 88]. This course is, I feel, a step in the right direction. I have never been able to understand Army thinking about drivers. As your article points out, there is a lamentable tendency to shanghai eightballs into the motor pool. Considering the importance of transportation in war, and the expenses of the motor pool in peace, this seems to me to eb the wrong approach, to put it mildly.

My own thinking on the matter is that the unit would be best served, and the over-all expense to the Government would be much reduced, if drivers were permanently assigned to their vehicles. Moreover, I feel that they should be given a specialist rating high enough to make each and every man in the unit feel that he wants to be a driver. Then, and only then, when a resupply of willing and eager drivers is assured, can you demand of them the full training and the careful maintenance of their vehicles which will assure the commander that he has competent drivers in available trucks whenever he needs them.

. . . I suggest that in order to qualify for the position of driver, graduation from some such course as you describe be required. In fact I would suggest that your maximum course be the absolute minimum for such positions. More and more intensive training would not be amiss, perhaps a resident full-time course of some 240 to 320 hours, culminating in a stiff examination both in the classroom and on the road.

And then, of course, the student should automatically receive his rating on graduation, and should know that in the normal course of events he will be used as a driver and as nothing else. Considering the hours of work required to maintain a vehicle properly, in addition to the time spent driving it, I would even go so far as to suggest that the driver be exempt from KP and like details, except insofar as a detail may require a vehicle and driver to do its work.

Of course, this sets the driver up as a

special person, with many benefits from his position. This, obviously, will provide both the incentive for the man to do his work to the utmost and the lever by which his commanders can keep him at it. Naturally, failure to accomplish the job would result in transfer to other duty, with accompanying loss of rating and prerogatives.

This approach, I firmly believe, would provide the best of maintenance for the trucks, and would consequently reduce the cost of operation more than the increased salary of the driver; not to mention assuring that the drivers were in fact drivers, capable of taking their truck where it was needed and arriving on time and in good order.

The second item I wish to comment on is the letter and accompanying editorial comments on the "Trainfire" course ["Letters to the Editor," page 96]. Once more, I approve most highly of a step in the right direction. But once more, I feel it is "too little, too late."

No matter if the present problem is getting men to fire their weapons in combat, or supplying adequate skill so that they hit their target, the basic approach to both sides of the question is still familiarity with the weapon, and with firearms in general. Therefore, it seems to me that one of the easiest, cheapest and best approaches would be the intensive use of small-bore firing.

My ideal view of the matter would see the basic trainee given his PRI just as soon after induction as possible, before the issue of uniforms or any like matters if necessary. Then, supply him with a .22 caliber weapon and see to it that he fires not less than 30 rounds each and every day that he remains in the military service; said firing to be on progressively difficult courses until the fundamentals of sight alignment and trigger squeeze are literally instinctive. Of course, additional training with the .30-caliber weapons would be given, and would replace the small-bore work on the days it was given. Experienced men could be allowed to substitute firing with the pistol after proving their proficiency with the rifle. Courses in "Trainfire" and the "Hogan's Alley" for pistol could be mixed with the conventional fixed target courses.

The point to this, of course, is that in the ultimate test, the whole duty of the soldier is to fire his weapon at his enemy, and in so doing, hit and kill or cripple him. All else is secondary. . . . proficiency with weapons comes only from firing them, frequently and often. Instincts developed on the small bore range do most emphatically carry over to the larger weapons, even to crew-served types.

Also, with proficiency comes the confident attitude that will lead to active use of the weapon in combat. A soldier who hesitates to fire on his enemy hesitates for fear of return fire. If he is morally sure that he can hit and kill that enemy, he will also know that the dead enemy will not return fire on him. (This is oversimplified, but you see my point.)

The other suggestion I have on this matter is that all troops be required to carry their primary weapon all during duty hours. Once more, a weapon becomes a part of the man largely by continual use, and having it around and handling it when not needed will lead to the familiarity of an old and trusted friend when it is needed.

Perhaps I'm dreaming, but I'd appreciate hearing your views on these ideas.

Harry R. McNeal
Field Correspondent
PS Magazine

Your letter was brought to the attention of the Ground Mobility Department and Weapons Department of the United States Army Infantry School and the United States Army Infantry Human Research Unit.

In regard to driver training, the Ground Mobility Department feels the ideas you expressed are commendable and, if implemented, would undoubtedly provide the "top-notch" type of driver needed by Infantry commanders. The department points out that it has been standard practice in Infantry units to assign one driver to a vehicle whenever the unit's assigned personnel is at or near authorized strength. This is no hard and fast rule because of the continuous turnover of personnel in field units. Here at USAIS, the Ground Mobility Department advocates a driver training course of from 70 to 130 hours. The course is not the ultimate and is by no means a one-shot affair but a continuing program implemented to the degree warranted by the unit's mission, its need and time available for such training.

Your thoughts on marksmanship proficiency for the soldier indicate your qualified approval of the current Trainfire program. Here are some comments furnished by the United States Army Infantry Human Research Unit which developed the Trainfire concept:

". . . The Army has long been convinced that skill as a marksman is largely dependent upon progressive practice which should naturally be as extensive as time, facilities and other factors permit. The use of reduced-distance small-bore firing has its place in the development of accuracy, one of the major factors involved. However, reduced-distance firing does not involve the problems of distance including target detection and the necessity for offsetting weather and light conditions. Furthermore, since in small-bore firing different weapons and ammunition are used, a direct transfer to the combat situation does not exist, particularly in time-pressure firing. In view of the foregoing factors all possible firing, including reduced-distance firing, is done with the service rifle and ammunition. Caliber .22 firing on small-bore ranges is used, howevr, wherever circumstances make such training more advantageous. . . . Ideas on the development of the rifleman's confidence in his own ability are considered sound. This is one of the major aims of the Trainfire project which . . . has four progressive phases . . . Trainfire marksmanship is the first. It is vital that the confidence developed be based upon sound techniques which transfer directly to combat. Under such conditions . . . confidence . . . will progressively increase as the rifleman realizes his superiority over the enemy. The habitual carrying of the rifle during training is general practice except when the nature of the training involves undue wear of the weapon."

As you point out, the ultimate aim of the soldier in combat is to fire his weapon at the enemy and, in so doing, hit and kill or cripple him. Trainfire is based on this concept. From the beginning, the basic fundamentals of shooting are utilized and regularly reemphasized. The trainee is constantly impressed with the fact that his job is to hit enemy personnel. All of the basic skills taught are those which he can use in combat: target detection, hitting detected targets while assuming combat positions and firing under time pressure. First the recruit is taught to fire accurately. He then engages indistinct or invisible targets on the basis of fleeting indications or likely areas. All his instruction integrates well-established learning principles. The will to fire, of course, can only be started during a recruit's marksmanship training. It must be progressively developed during his career. Such factors as morale, fighting spirit, pride in unit and confidence in leaders which are important in developing the will to fire must be ingrained throughout the soldier's individual and unit training.—Editor.

WHAT'S NEW FOR INFANTRYMEN

DEVELOPED

175mm Gun

A newly developed and extremely versatile field artillery piece, the 175mm gun, incorporates battlefield capabilities which are in many respects superior to the combined features of familiar World War II weapons. The 175mm gun can fire readily in any direction and occupy its firing position quickly with no need to dig recoil and spade pits. Although classed as a gun, its included angles of elevation (0° to 65°) and its selective use of three graded propellant charges, enable the weapon to fire on enemy positions on reverse slopes—a type of firing usually performed by a howitzer. The gun and top carriage of the weapon are balanced on a ball on a center float. By means of a built-in jack located on the track of the center float, the rear of the carriage can be raised off the ground in a moment, thus enabling the weapon to be easily pushed around a full 360° to any desired azimuth. In addition to new elevation sights, the weapon has mechanical counters displaying actual numbers instead of micrometer scales which required interpolation. As with the 280mm gun, the 175 is equipped with two complete recoil systems, operating independently of each other, to absorb the recoil forces and return the recoiling masses to the in-battery position.

Mortar Locator

The development of a new radar mortar locator has been announced by the United States Army Signal Corps. Equipped with an electronic brain that pinpoints an enemy position in seconds, the locator's range is greater than that of any mortar known today.

It boasts a new beam technique which causes the projectile to appear as blips on a screen. By centering hairlines on the blips, the computer will get a direct map coordinate reading of the enemy position which may then be relayed to the artillery battery for counterfire.

Officially designated as the AN/MPQ 4, the new locator is compact and mobile. Except for a power supply, all components are mounted on a two-wheel trailer. The console of the spotter may be operated in a foxhole as far distant as 150 yards from the trailer.

On previous mortar locators, the antenna moved back and forth while scanning. However, the antenna of the new improved set remains stationary during operation, automatically picking up anything in its sector.

Cookset

The Quartermaster Corps has unveiled a new portable cabinet cookset capable of feeding 50 men. It has been designed to replace the field range now in use.

Consisting of a cabinet, utensils and a gasoline burning unit, the new cookset requires only 11 repair parts to keep it in operation as compared to the 49 required for the present field range. The cookset weighs only 114 pounds and the parts can be stored inside the cabinet, thus making it portable and capable of

operation in transit. In addition, the cookset may be operated along with the field range in a group setup as all components are interchangeable.

Dehydrated Rations

As part of the Quartermaster research and development program, new prototype rations have been created to provide better feeding for today's highly mobile, widely dispersed fighting forces. The proposed rations are currently being tested by troops in the field at Fort Benning.

The new rations represent a feeding concept designed to provide sufficient versatility to satisfy the needs of both forward- and rear-area combat troops.

Based on a new food processing technique, the rations reduce the number of food service personnel required in combat zones as well as the amount of equipment required to store, transport, prepare and serve them. In addition, there is a gross reduction in weight of the parcels, thus permitting greater flexibility of use and maximum transportability.

The rations are prepared by the processes of radiation preservation, freeze drying or a combination of precooking with either radiation or dehydration. They were designed with the idea of feeding at least two hot meals a day to individuals or to groups ranging from five to 1000.

Primary among the new group of rations is the *meal, ready-to-eat, individual.* It is planned for the combat man in the forward contact area of the battle zone. It contains items which are highly acceptable in the cold state and require no preparation other than opening packages.

To augment this individual meal is the *ration, individual, combat, meal type.* It may be used either as a meal packet or in multiples of three as a complete ration. It contains a larger selection of food components than is now provided in any current operational ration except the B ration.

Two other precooked meals are the *meal, precooked, dehydrated, 25-in-1* and the *meal, precooked, dehydrated, 5-in-1,* both identical in component parts. Packaging is the essential difference. These two are so designed that a soldier with little specialized food service training can prepare them for a group of men. A typical luncheon for 25 men includes precooked dehydrated chili and beans, instant rice, pasteurized fruit mix with sugar, pasteurized bread, soda crackers, jam, margarine, cookies, instant cocoa beverage. The parcel include collapsible paper cups, plastic spoons, fiberboard serving trays for individual use and wooden ladles for serving.

A descendant of the present B ration is the *meal, uncooked, 25-man,* intended largely for rear area use in the combat zone. It contains uncooked foods preserved chiefly by dehydration or radiation. This ration includes fresh irradiated products and promises to provide a highly acceptable menu for troops in rear areas. Prepared in the zone of interior, it approaches the A ration in acceptability but requires no refrigeration or supplementation. Flavor is preserved by vacuum packing before irradiation.

A typical dinner for 25 men using this ration consists of dehydrated lima bean soup, sweet potatoes, green beans, orange juice, apples and cheese; irradiated chicken thighs; and rolls, shortening, margarine, crackers, sugar, flour, cinnamon, coffee, cream and salt. The meal has a gross weight of 34 pounds and occupies 1.9 cubic feet.

In addition to providing hot meals for more fighting men, other advantages listed for the new ration include fuel and water conservation, fewer personnel required in preparation, increased diversification of diet, greater nutritional value,

no need of refrigeration equipment in combat areas and a greater adaptability to air supply and use by mobile forces.

REVISED

ROCID Problems

Over 90% of Tactical Department problems are being or have been revised or rewritten to conform to the new organization and doctrine. All classes which began after 1 May will receive ROCID instruction.

Two problems portraying the tactical employment of the new rifle company on the atomic battlefield have been rewritten by USAIS Tactical Department. They are "Defensive Operations Under Atomic Warfare Conditions" (2178) and "Offensive Operations Under Atomic Warfare Conditions" (2179). Basic Infantry officer, officer candidate and associate Infantry company officer classes receive the revised problems.

The defensive operations problem is a two-hour exercise, during which the student acts as the commander of a company in the defense. The student organizes a company defense against enemy attack, including a withdrawal to a switch position. Friendly and enemy atomics are used.

The offensive operations problem is also a two-hour map exercise and is a continuation of the situation as it existed at the conclusion of the defensive problem. Students, still acting as company commanders, solve requirements concerning the preparation for, and conduct of, an attack as the leading element of the battle group moving along an axis against a deep objective.

Both problems stress the friendly employment of atomic weapons and the actions taken to minimize the effect of enemy atomic weapons.

Problem 7305, a two-hour class based on unit organization under the pentomic concept is now being presented to all officer and leader classes at USAIS.

It consists of a conference and practical exercise explaining Infantry and airborne organizational objectives and principles; organization, equipment, capabilities and mission of the Infantry division with emphasis on the battle group. It also includes a comparison of Infantry and airborne pentomic divisions.

Logistical Procedures

The supply and maintenance platoon, organic to headquarters and headquarters company, battle group, is organized into a platoon headquarters, ammunition squad and truck squad to perform logistical functions for the battle group. In combat, the supply and maintenance platoon: (a) operates the battle group supply and service area (battle group trains area) where request, receipt and issue of supplies and equipment are directed and controlled; (b) maintains appropriate supply records and (c) performs first and second echelon maintenance for battle group units within the capabilities of maintenance personnel and available tools.

The medical platoon, organic to headquarters and headquarters company, battle group, is organized into a platoon headquarters, a treatment section and an evacuation section. In combat, the treatment section establishes one or more battle group aid stations and provides the rifle companies and mortar battery with company aid men. The evacuation section removes casualties to the battle group aid station by litter or ambulance.

Within the battle group, requests for supplies and equipment from subordinate units are submitted through supply channels (except for class IV supplies, which are requested through command channels) to the logistical control point (LCP) located in the battle group supply and service area. After unit requests are processed at the LCP consolidated battle

group requisitions are forwarded to the division technical services. Expendable medical supplies are requested informally and delivered through medical channels. Nonexpendable medical supplies, evacuated with casualties, are exchanged on an item-for-item basis at each location where casualties are transloaded.

Normally, the technical services deliver all class I, II, and IV supplies to the battle group supply and service area using transportation from the division transportation battalion (unit distribution). The division quartermaster company delivers class III supplies to the supply and service area. Class V supplies (ammunition) are obtained by replenishment from the nearest Army ammunition supply point using battle group transportation.

Recovery and Disposition

Effective immediately, in all cases where the term "graves registration" is used in units down to and including division, the term "recovery and disposition" will be substituted. For units within the battle group, the term "collection and evacuation" will be substituted for the term "graves registration." During combat a three-man collection and evacuation section, organically assigned to the division quartermaster company, will be attached to each battle group.

Advanced Tactics Exam

In addition to the normal attack, defense and retrograde examinations, advanced level classes at USAIS now receive a tactical examination designated as the advanced tactics examination.

This exam follows instruction presented by the Tactical Department concerning the tactical employment of atomic weapons. It emphasizes the many factors which the commander must consider in operating under atomic warfare conditions.

Instructional Plans

With the publication of TC 7-2, "Combat Formations and Battle Drill,"[1] battle drill became U.S. Army doctrine and will be included in the course of instruction at USAIS. Its concepts will be integrated into other resident problems where appropriate and will be given in Problem 2002, "Combat Formations and Battle Drill."

Troop Education

Following publication of AR 355-5, 20 February 1957, instruction in public and troop information will be presented as an integrated conference and practical exercise emphasizing the organization for and the objectives of both types of information in the program. The information program is a command function and in the ROCID TOE the battle group executive officer has been designated as the information officer. Troop education is to be taught as a responsibility of G1 (S1) as outlined by AR 621-5.

New Names

The Publications and Visual Aids Office, USAIS, has been redesignated the Editorial and Pictorial Office. The sections of the office have been renamed and a new section has been activated. The Training Literature Section is now the Training Literature Editing section; the Visual Aids Section has been changed to the Art and Film Section; the Quarterly Section is now known as the Special Editing and Quarterly Section; and the Publications Section is now the Mailing List and Printing Liaison Section.

The new section is the Army Training Program Development Section. Its functions are the development and preparation of those Army training programs, Army training tests and subject schedules for which USAIS has primary responsibility.

[1]See "Battle Drill," January 1957. *Infantry School Quarterly.*

FIELD MANUALS

The following training literature is being written and edited; publication can be expected during the next year:

FM 7-10, Rifle Company, Infantry Division Battle Group, (revision).

FM 7-21, Headquarters and Headquarters Company, Infantry Division Battle Group, (revision).

FM 7-40, Infantry Division Battle Group, (revision).

FM 21-18, Foot Marches, (revision).

FM 21-20, Physical Training, (revision).

FM 23-5, U.S. Rifle, Caliber .30, M-1, (revision).[2]

FM 23-30, Grenades and Pyrotechnics, (revision).

FM 23-32, 3.5-inch Rocket Launcher, (revision).

FM 23-82, 106mm Rifle, M-40, (revision).

FM 23-90, 81mm Mortar, M-1, (revision).

FM 57-35, Army Transport Aviation, Combat Operations (new).

TM 21-200, Physical Conditioning, (new).

TM 57-210, Air Movement of Troops and Equipment, (revision).

DA pamphlet on Ranger training.

The following manuals have been forwarded to USCONARC for approval:

ROTCM 145-10, Organization of the Army and ROTC.

The following manuals have been forwarded to Department of the Army for approval and publication.

FM 21-75, Combat Training of the Individual Soldier and Patrolling. When approved and published FM 21-75 will supersede TC 17, Battle Indoctrination, and TC 20, Sniper Doctrine.

FM 23-7, Change 2, Carbine.

FM 23-15, Change 3, Browning Automatic Rifle, Caliber .30, M-1918A2.

TC 21, Physical Training.

The following field manuals have been published recently by Department of Army and are available to instructors through normal supply channels:

FM 23-85, Change 3, 60mm Mortar, M-19. This is a fairly extensive change which includes the current fire commands, military signs and symbols and the correction of technical errors.

TM 57-210, Air Movement of Troops and Equipment, 1 February 1957. This is a complete revision of the old manual.

TC 7-2, Combat Formations and Battle Drill, 14 January 1957. A guide for rifle company commanders, platoon leaders and squad leaders in training their squads and platoons in combat formations.

TRAINING FILMS

The following training films have been approved for release to requesting units:

MF 19-8699, Prisoners of War, 22 minutes.

OC 12, The Mission of the United States Army, 37 minutes.

TF 5-2276-80, Water Purification, 4-8 minutes.

TF 5-2361, Demolitions, Clearing Stumps and Boulders, 9 minutes.

TF 5-2362, Demolitions, Placing Charges on Steel, 5 minutes.

TF 5-2406-17, Map Reading, Basic, 5-7 minutes.

TF 9-2329, Automotive Electricity for Military Vehicles, Part I, Principles of Automotive Electrical Circuits, 15 minutes.

TF 9-2330, Automotive Electricity for Military Vehicles, Part II, Principles of Operation of the Generator, 13 minutes.

TF 9-2078, Automotive Electricity for Military Vehicles, Part III, Principles of Operation of the Starting Motor, 14 minutes.

[2]This manual is being revised even though the M-14 and M-15 have been adopted as standard. The new rifles are not expected to be in the hands of troops for three or four years.

TF 9-2332, Automotive Electricity for Military Vehicles, Part IV, The Ignition Circuit, 11 minutes.

TF 9-1559, Automotive Electricity for Military Vehicles, Part V, Principles of Operation of the Generator Regulator, 12 minutes.

TF 9-1531, Automotive Electricity for Military Vehicles, Part VI, Principles of Operation of the Automotive Magneto, 14 minutes.

TF 15-2358, The Special Court-Martial, 56 minutes.

TF 17-2387, Auxiliary Means of Communication, Part I, Light Aircraft Message Drop, 5 minutes.

TF 17-2388, Auxiliary Means of Communication, Part II, Light Aircraft Pickup, 3 minutes.

INSTRUCTIONAL MATERIAL

The following USAIS instructional material is suitable for resident as well as nonresident instruction and may be ordered from the Book Department, United States Army Infantry School, Fort Benning, Georgia, at the prices shown:

Desert Operations, 2272-USAR, 1 hour. A conference on the principles of infantry tactics applied to an Infantry unit operating in desert terrain, stressing tactical movements, attack and defense; comparisons of desert operations to operations in normal terrain including differences in techniques; security, reconnaissance and deception in desert operations. 15¢.

Signal Orders, 3309-USAR, 1 hour. Conference and practical exercise demonstrating the SOI and SSI as an aid for commanders and staff officers. Emphasis is placed on message transmission security devices. 55¢.

Organization and System for Maintenance, 4906-USAR, 1 hour. Conference covering the organization and system for maintenance with emphasis upon second echelon maintenance; purpose, use and disposition of records for the control of vehicle maintenance; command responsibility for first and second echelon maintenance. 20¢.

USAR, 1 hour. Conference and demonstration covering the selection and training of wheeled and tracked vehicle operators; equipment and terrain necessary to produce qualified drivers. 20¢.

Aerial Delivery Techniques, 5678-USAR, 1 hour. Conference and demonstration to teach the commander's responsibility in receiving aerial resupply and familiarization with doctrine, tactics,

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techniques and equipment used in aerial resupply. 30¢.

Command and Leadership—Indications of Leadership, 6124-USAR, 2 hours. Conference and practical exercise on the evaluation of leadership results in terms of morale, discipline, esprit de corps and proficiency, using combat examples on methods of developing and evaluating the indications. 20¢.

Counterfire Organization and Technique 6615-USAR, 2 hours. An explanation of counterfire operations to include means and methods of locating enemy weapons, counterfire organization, counterfire weapons, shelling reports and the importance of rendering these reports promptly; map exercise on techniques of locating enemy weapons. 50¢.

Operations, Techniques, 6910A-USAR, 2 hours. Conference and practical exercise covering operational planning as it pertains to the techniques of graphic representation of operation plans and operation orders; the use of situation maps, operation overlays, and planning maps. Map exercise involving the preparation of an operation overlay stressing the technique of graphic representation. 45¢.

Joint Air Movements, 6967-USAR, 3 hours. Conference and practical exercise covering planning, procedure, air movement forms, determination of aircraft requirements. 50¢.

Preparation and Conduct of a Field Exercise, Rifle Platoon in the Attack, 7251-USAR, 7 hours. A conference on the preparation of field exercises for small units; planning and preparing a field exercise, rifle platoon in the attack. 35¢.

First Aid, 7723-USAR, 2 hours. Conference and demonstration during which the principles of first aid are discussed with emphasis on the control of hemorrhage and the recognition and treatment of fractures. Special wounds and injuries which arise from military situations are discussed. 20¢.

Medical Aspects of Atomic Explosions, 7735-USAR, 1 hour. Conference covering a hypothetical situation depicting casualty information from the use of a nominal mass destruction weapon and the effects of heat (thermal), blast, and radiation on the human body; the psychological effect of the weapon upon personnel and the relation to the medical service; first aid requirements for the individual; the treatment required for each effect of the weapon and the overall effect on the medical service to include treatment, evacuation and medical supply. 10¢.

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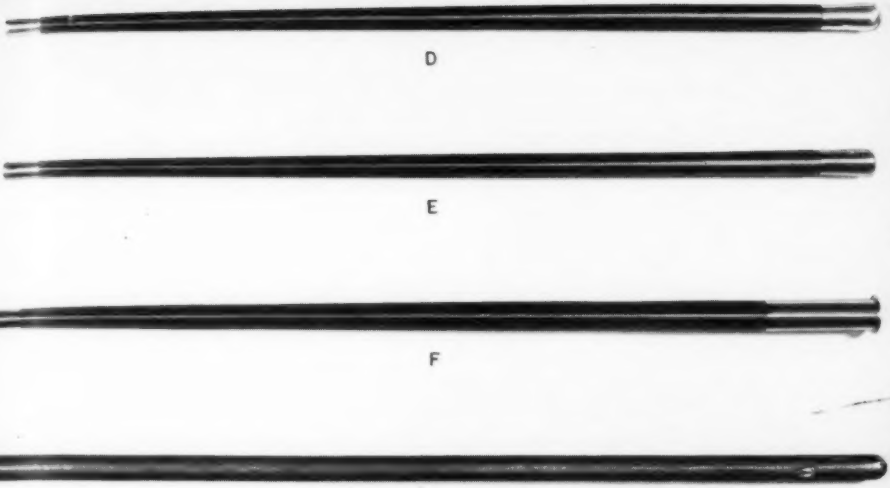

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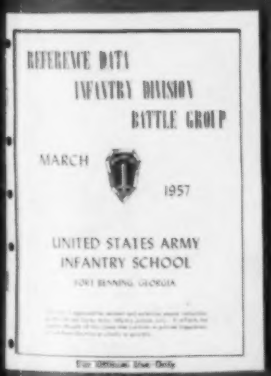
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